Motherboards

MMGA Series

MicroATX Motherboard with 2 PCI and 1 PCIe Slots, VGA, SATA, RAID, USB, LAN, and Audio

RoHS compliant

USER'S MANUAL

VER. 2.0C • MAY 2009

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MMGA Series		
Revision #	**Description**	**Date of Issue**
1.0	Initial Release	January 3rd 2008
2.0C	Revision	May 14th 2009

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Manual Conventions

WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word "warning" is written as "**WARNING**," both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:

WARNING:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the MMGA or personal injury to the user. Please take warning messages seriously.

CAUTION!

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the MMGA. Cautions are easy to recognize. The word "caution" is written as "**CAUTION**," both capitalized and bold and is followed. The italicized text is the cautionary message. A caution message is shown below:

CAUTION:

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the MMGA. Please take caution messages seriously.

NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word “note” is written as “**NOTE**,” both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

NOTE:

This is an example of a note message. Notes should always be read. Notes contain critical information about the MMGA. Please take note messages seriously.

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Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact CyberResearch, Inc.

The items listed below should all be included in the MMGA package.

- 1 x MMGA motherboard
- 3 x SATA power cables
- 6 x SATA cables
- 1 x Dual RS-232 cable
- 1 x USB cable
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x IO shielding

Images of the above items are shown in **Chapter 3**.

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Chapter

1

Introduction

1.1 Overview

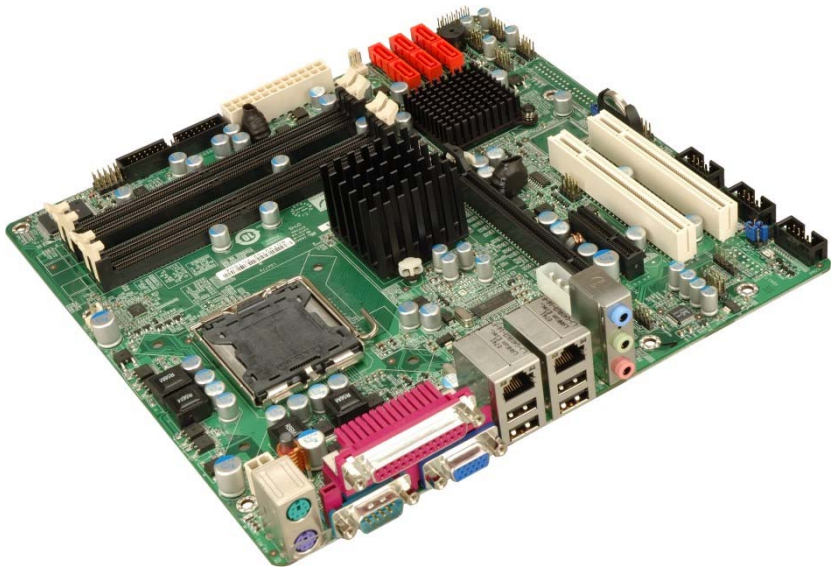

Figure 1-1: MMGA uATX Motherboard

The MMGA uATX form factor motherboard (**Figure 1-1**) is an LGA775 Intel® Core™2 Quad, Intel® Core™2 Duo or Intel® Celeron® CPU processor platform. Both 45nm core (Wolfdale, Yorkfield) and 65nm core (Conroe) processors are supported. (For a full list of supported processors please refer to **Section 2.3**)

Up to four 2.0 GB 667 MHz or 800 MHz un-buffered DDR2 SDRAM DIMM are supported by the Intel® Q35 graphics memory controller hub (GMCH). The Intel® Q35 GMCH also has a single PCI Express x16 (PCIe x16) expansion lane for a PCIe x16 graphics card.

The integrated Intel® ICH9DO I/O controller hub (ICH) supports six SATA II drives with data transfer speeds of 3.0 Gbps with SATA RAID configuration support. Twelve USB 2.0 channels, one expansion PCIe x4 channel and two expansion PCI channels provide flexible expansion options. Support for a (optional) trusted platform module (TPM) provides additional system security during system boot-up.

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1.1.1 MMGA Features

Some of the MMGA features are listed below.

- Supports the following Intel® LGA775 processors:
  - Intel® Core™2 Duo (45nm and 65nm)
  - Intel® Core™2 Quad (45nm and 65nm)
  - Intel® Celeron® (65nm)
- Supports four 240-pin 2 GB 667 MHz or 800 MHz DDR2 DIMMs
- Six SATA II drives with transfer rates of 3.0 Gbps supported
- Twelve USB 2.0 devices supported (eight onboard and four on the rear panel)
- Dual GbE Ethernet connectors
- uATX form factor
- RoHS compliant
- Supports ATX power supplies

1.2 MMGA Overview

1.2.1 MMGA Overview Photo

The MMGA has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the MMGA.

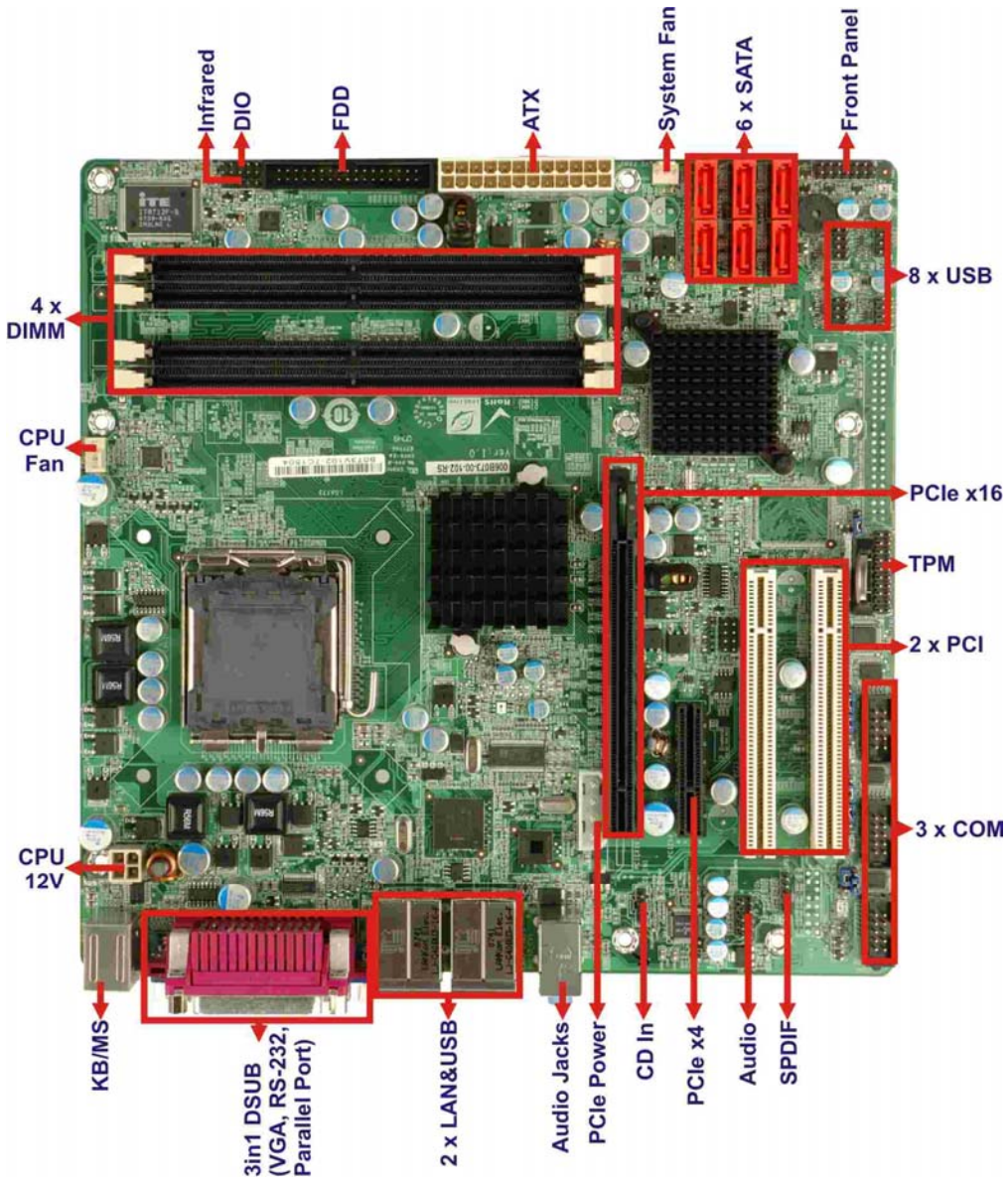

Figure 1-2: MMGA Overview [Front View]

1.2.2 MMGA Peripheral Connectors and Jumpers

The MMGA has the following connectors on-board:

- 1 x ATX power connector
- 1 x Audio connector
- 1 x CD in connector
- 1 x Cooling fan connector, CPU

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- 1 x Cooling fan connector, System
- 1 x CPU power connector
- 1 x Digital input/output connector
- 4 x DIMM sockets
- 1 x Floppy drive connector
- 1 x Front panel connector
- 1 x Infrared (IrDA) connector
- 2 x PCI slots
- 1 x PCIe x16 slots
- 1 x PCIe x4 slots
- 1 x PCIe power connector
- 6 x Serial ATA drive connectors
- 3 x Serial port connectors
- 1 x SPDIF connector
- 1 x SPI flash connector
- 1 x TPM connector
- 4 x USB connectors (support eight USB devices)

The MMGA has the following external peripheral interface connectors on the board rear panel.

- 3 x Audio jacks
- 2 x Keyboard/mouse connectors
- 1 x Parallel port
- 2 x RJ-45 Ethernet connectors
- 1 x Serial port
- 4 x USB 2.0 connectors
- 1 x VGA connector

The MMGA has the following on-board jumpers:

- Clear CMOS
- COM port pin 9 setting
- COM port pin 9 voltage setting

1.2.3 Technical Specifications

MMGA technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

Specification	MMGA
Form Factor	uATX
System CPU	LGA775 Intel® Core™2 Quad LGA775 Intel® Core™2 Duo LGA775 Intel® Celeron®
Front Side Bus (FSB)	800 MHz, 1066 MHz or 1333 MHz
System Chipset	**Northbridge**: Intel® Q35 Express Chipset **Southbridge**: Intel® ICH9DO
Memory	Four 240-pin DDR2 DIMM sockets support 2.0 GB 667 MHz or 800 MHz DDR2 DIMMs
Super I/O	ITE IT8712F Rev. I
Display	Analog VGA display through external DB-15 connector
BIOS	AMI BIOS label SPI EEPROM 4.0 MB
Audio	RealTek ALC883 codec.
LAN	One Intel® 82566DM (PHY) and Intel® ICH9DO (MAC) One PCIe x1 Intel® 82573L (MAC and PHY)
COM	Four RS-232 serial ports ■ Three by onboard pin-headers ■ One by external connector
USB2.0	Twelve USB 2.0 devices supported: ■ Eight by onboard pin-headers

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	■ Four by external connectors
SATA	Six 3.0 Gb/s SATA II drives supported
SATA RAID Levels	RAID 0, RAID 1, RAID 5 and RAID 10
Keyboard/mouse	By external PS/2 connector through the ITE IT8712F super I/O
Digital I/O	One 8-bit digital input/output connector; 4-bit input/4-bit output through the ITE IT8712F super I/O
Watchdog Timer	Software programmable 1-255 sec. through the ITE IT8712F super I/O
Infrared	One IrDA connector through the ITE IT8712F super I/O.
Power Supply	ATX power supply
TPM	Supports TPM v1.2 with 20-pin onboard pin-header
Fan Connector	Three pin system fan pin-header Four pin CPU fan pin-header
Buzzer	Yes
Power Consumption	3.3V@2.41A, 5V@5.71A, +12V@3.69A (3Dmark® 2001) and 5VSB@0.13A (3.0 GHz E6850 Intel® Core™2 Duo CPU with four 2.0 GB, 800 MHz DDR2 DIMM running 3Dmark® 2001)
Temperature	0ºC – 60ºC (32ºF - 140ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	244 mm x 244 mm
Weight (GW)	1.1 kg

Table 1-1: Technical Specifications

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Chapter

2

Detailed Specifications

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2.1 Dimensions

2.1.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 243.84mm
- **Width**: 243.84mm

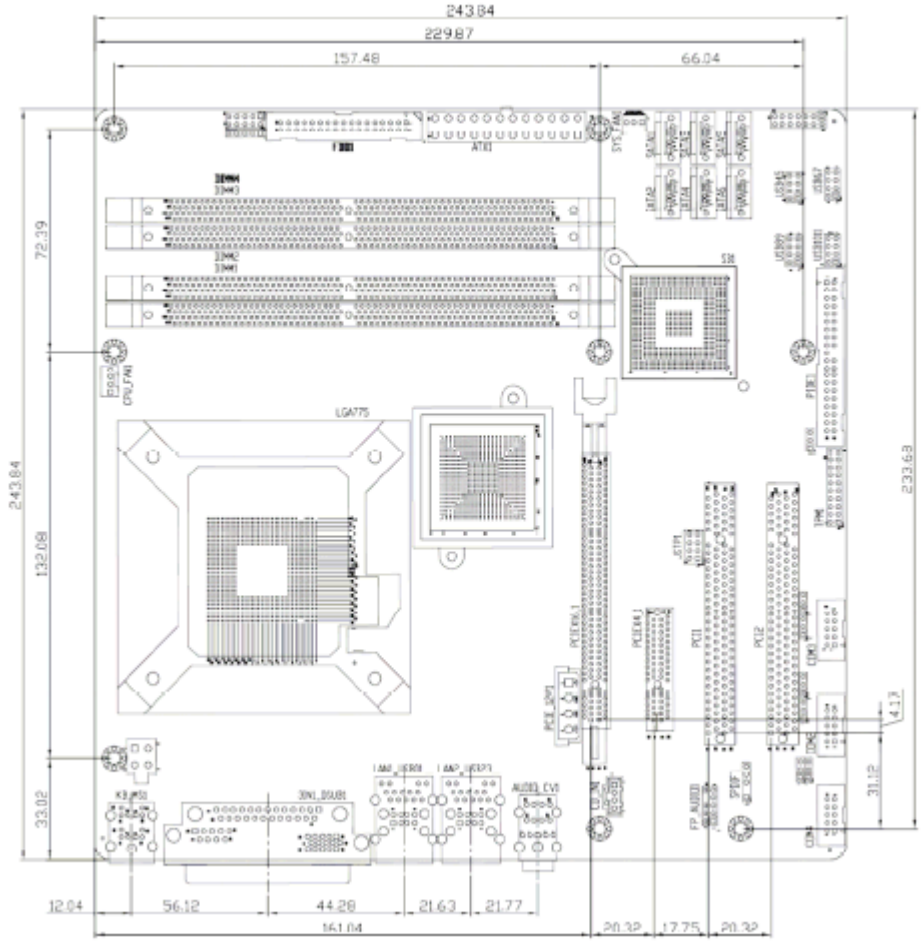

Figure 1-3: MMGA Dimensions (mm)

2.1.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 1-4**.

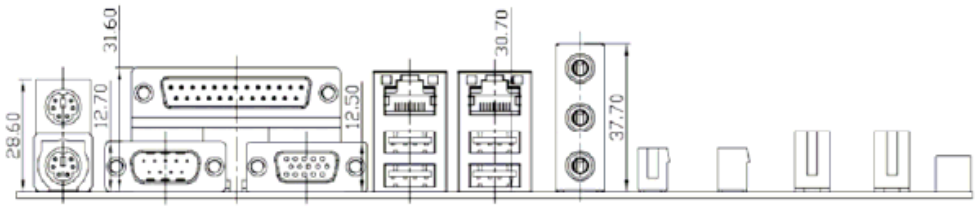

Figure 1-4: External Interface Panel Dimensions (mm)

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2.2 Data Flow

Figure 1-5 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

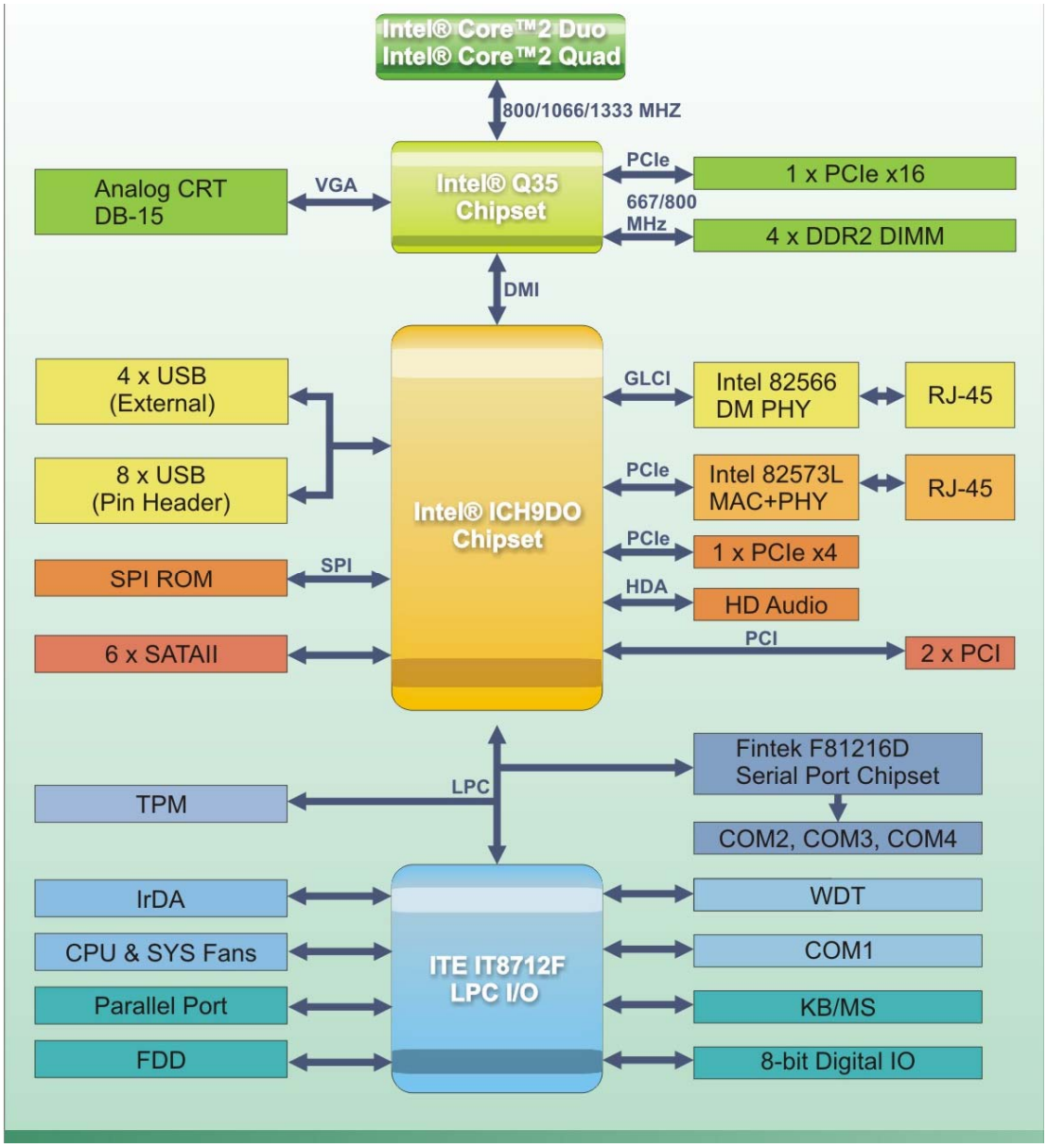

Figure 1-5: Data Flow Block Diagram

2.3 Compatible Processors

2.3.1 Supported Processors Overview

The MMGA supports the following Intel® LGA775 processors

- Intel® Core™2 Quad (Yorkfield)
- Intel® Core™2 Duo (Wolfdale)
- Intel® Core™2 Duo (Conroe)
- Intel® Celeron® (Conroe)

2.3.2 Supported Intel® Core™2 Quad (Yorkfield) Processors

The Yorkfield core Intel® Core™2 Quad CPU is a 45nm LGA775 processor.

2.3.3 Supported Intel® Core™2 Duo (Wolfdale) Processors

The Wolfdale core Intel® Core™2 Duo CPU is a 45nm LGA775 processor.

2.3.4 Supported Intel® Core™2 Duo (Conroe) Processors

Table 1-2 lists the Conroe core Intel® Core™2 Duo processors supported on the MMGA. All the processors in Table 1-2 are 65nm LGA775 processors with the following features:

- Enhanced Halt State (C1E)
- Enhance Intel® Speedstep® Technology
- Execute Disable Bit
- Intel® 64
- Intel® Thermal Monitor 2
- Intel® Virtualization Technology
- Intel® Dual Core Technology

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Processor #	CPU Speed	FSB Speed	Cache Size
E6850	**3.0 GHz**	**1333 MHz**	**4 MB**

Table 1-2: Supported Intel® Core™2 Duo (Conroe) Processors

2.3.5 Supported Intel® Celeron® (Conroe) Processors

Table 1-2 lists the Conroe core Intel® Celeron® processors supported on the MMGA. All the processors in Table 1-2 are 65nm LGA775 processors with the following features:

- Execute Disable Bit
- Intel® 64

Processor #	CPU Speed	FSB Speed	Cache Size
440	**2.0 GHz**	**800 MHz**	**512kB**

Table 1-3: Supported Intel® Celeron® Processors

2.4 Intel® Q35 Northbridge Chipset

2.4.1 Intel® Q35 Northbridge Chipset

The Intel® Q35 Northbridge chipset is an advanced Graphics and Memory Controller Hub (GMCH) that supports a range of Intel® processors including 45nm Wolfdale dual core and Yorkfield quad core and 65nm Conroe core processors. The Intel® Q35 Northbridge supports 1333 MHz, 1066 MHz, or 800 MHz FSB and up to 8.0 GB of 667 MHz or 800 MHz DDR2 SDRAM. The Intel® Q35 Northbridge is interfaced to an Intel® ICH9DO Southbridge chipset through a Direct Media Interface (DMI) communications link.

2.4.2 Intel® Q35 Front Side Bus (FSB) Support

The Intel® Q35 Northbridge supports processors with the following FSB speeds:

- 800 MHz
- 1066 MHz

- 1333 MHz

The LGA775 socket, Intel® Q35 Northbridge and the FSB are shown in **Figure 1-6**.

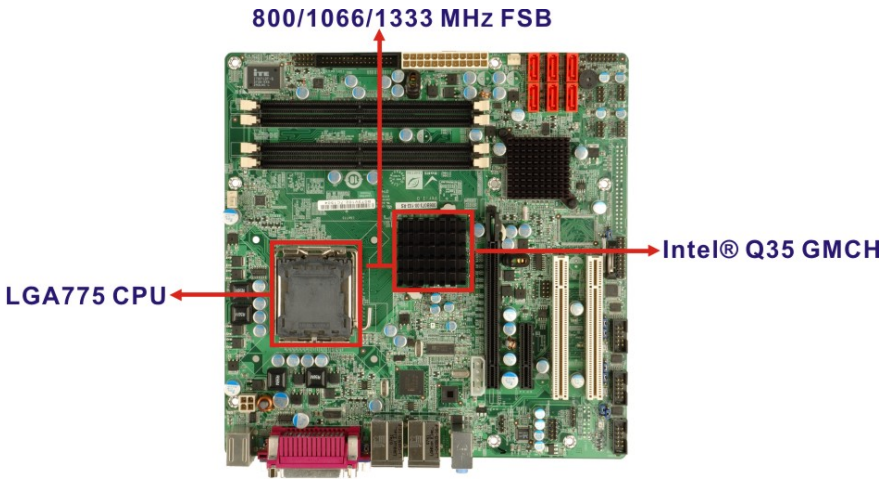

Figure 1-6: Front Side Bus (FSB)

2.4.3 Intel® Q35 Memory Controller

The memory controller on the Intel® Q35 Northbridge can support up to 8.0 GB of DDR2 SDRAM. Four DDR2 SDRAM DIMM sockets on the MMGA are interfaced to the Intel® Q35 Northbridge memory controller. The DDR2 sockets are shown in **Figure 1-7.**

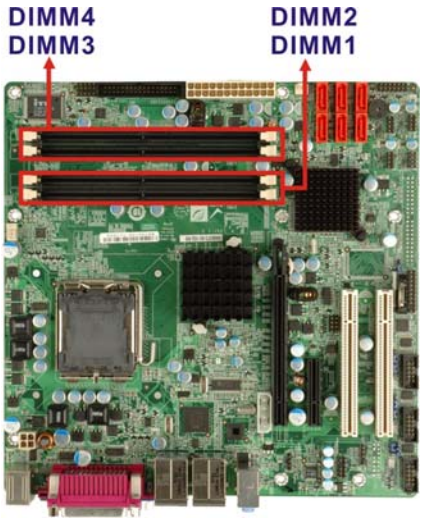

Figure 1-7: DDR2 DIMM Sockets

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CAUTION:

If more than one DDR2 DIMM is being installed in the system, please purchase two DIMM that have the same capacity and operating frequency.

Each DIMM socket can support DIMMs with the following specifications:

- DDR2 only
- Un-buffered only
- 667 MHz or 800 MHz
- 2.0 GB maximum capacity per DIMM (8.0 GB supported with four DIMM)
- Memory bandwidth:
  - 6.4 GBps in single-channel or dual-channel asymmetric mode
  - 12.8 GBps in dual-channel interleaved mode assuming DDR2 800MHz

2.4.4 Intel® Q35 PCIe x16 Interface

The Intel® Q35 PCIe bus is compliant with the PCI Express 1.1a Specifications has the following PCIe lanes:

- One PCIe x16 graphics interface
- PCIe frequency of 1.25 GHz (2.5 Gbps in each direction)

For further details on the PCIe interfaces, please refer to **Section 2.6.2** on **page 25**.

2.4.5 Intel® Q35 Graphics and Display Features

NOTE:

The Intel® Q35 Graphics and Display Features can be configured in the Northbridge BIOS configuration screen. Please refer to **Section 6.7.1** on **page 149**.

The Intel® Q35 GMCH integrated graphics device (IGD) has 3D, 2D and video capabilities. The Unified Memory Architecture (UMA) uses up to 256 MB of Dynamic Video Memory Technology (DVMT) for graphics memory. External graphics accelerators on the PCIe graphics (PEG) port are supported but cannot work simultaneously with the IGD.

2.4.6 Intel® Q35 Analog Display Capability

A single external female DB-15 (VGA) connector interfaces an analog display to an analog CRT port on the Intel® Q35 GMCH. The VGA connector is shown in **Figure 1-8**.

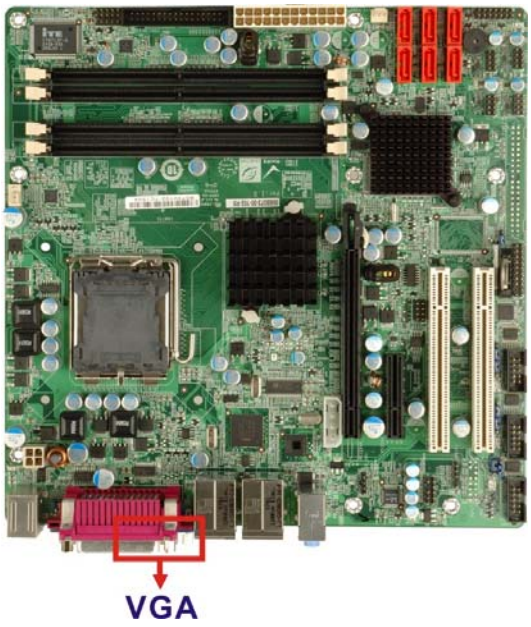

Figure 1-8: VGA Connector

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Some of the capabilities of the Intel® Q35 analog CRT port are listed below:

- 400 MHz Integrated 24-bit RAMDAC
- Up to 2048x1536 @ 75 Hz refresh
- Hardware Color Cursor Support
- DDC2B Compliant Interface

2.4.7 Intel® Q35 Direct Media Interface (DMI)

The Direct Media Interface (DMI) is the communication bus between the Intel® Q35 GMCH and the ICH9DO I/O controller hub (ICH). The DMI is a high-speed interface that integrates advanced priority-based servicing and allows for concurrent traffic and true isochronous transfer capabilities. The DMI is shown in **Figure 1-9**.

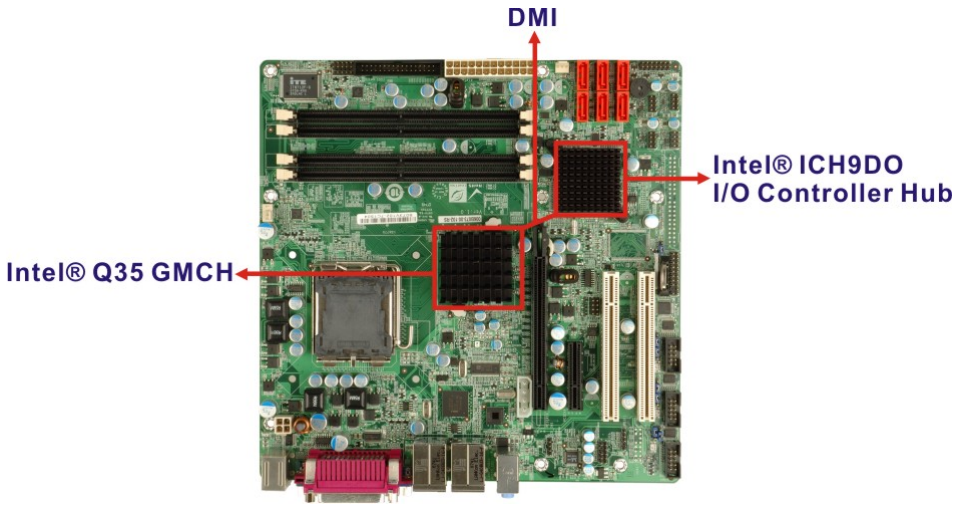

Figure 1-9: DMI Chip-to-Chip Connection

Some of the features of the DMI include:

- 2.0 GBps point-to-point DMI to ICH9DO (1.0 GBps in each direction)
- 100 MHz reference clock (shared with PCI Express* Graphics Attach)
- 32-bit downstream addressing
- APIC and MSI interrupt messaging support
- Message Signaled Interrupt (MSI) messages
- SMI, SCI and SERR error indication

2.5 Intel® ICH9DO Southbridge Chipset

2.5.1 Intel® ICH9DO Overview

Intel® ICH9DO Southbridge is an advanced I/O controller hub (ICH) connected to the Intel® Q35 Northbridge through a DMI connection. The Intel® ICH9DO has six PCIe x1 ports, supports up to twelve USB 2.0 devices, six 3.0 Gbps SATA II drives with Intel® Matrix Storage Technology (ACHI, RAID 0, RAID 1, RAID 5 or RAID 10). A High-Definition audio (HDA) controller can be connected to an HDA codec. The PCI Masters provide PCI expansion capabilities through the two PCI slots on the motherboard.

2.5.2 Intel® ICH9DO Features

The ICH9DO Southbridge chipset on the MMGA has the features listed below.

- Complies with PCI Express Base Specification, Revision 1.1
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
  - Enhanced DMA controller
  - Interrupt controller
  - Timer functions
- Integrated SATA host controller with DMA operations on six ports with data transfer rates up to 3.0 Gbps
- Supports twelve USB 2.0 devices with six UHCI controllers and two EHCI controller
- Complies with System Management Bus (SMBus) Specification, Version 2.0
- Supports Intel® High Definition Audio
- Supports Intel® Matrix storage technology
- Contains Low Pin Count (LPC) interface
- Serial Peripheral Interface (SPI) for Serial and Shared Flash

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2.5.3 Intel® ICH9DO High Definition Audio Implementation

A RealTek ALC883 High Definition Audio (HDA) codec is interfaced through the Intel® High Definition Audio serial link to the HDA controller integrated on the Intel® ICH9DO. The audio connector is shown in **Figure 1-10**.

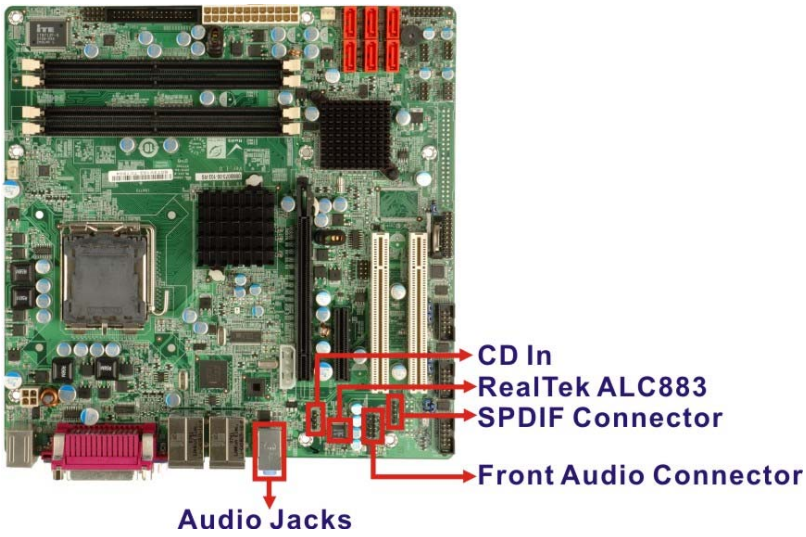

Figure 1-10: Audio Connectors

2.5.4 Intel® ICH9DO Ethernet Controller

NOTE:

Gigabit Ethernet (1000 Mbps) is only supported in S0.

The Intel® ICH9DO Southbridge integrated GbE controller is interfaced to an Intel® 82566DM Gigabit LAN connect device through the Gigabit LAN Connect Interface (GLCI) and LAN Connect Interface (LCI). The GLCI is shared with the PCIe x1 port 6. The Intel® 82566DM connects the Intel® ICH9DO Southbridge integrated GbE controller to an external RJ-45 Ethernet LAN connector to provide GbE access.

NOTE:

To enable the Intel® ICH9DO GbE Wake-on LAN function, the Wake-on LAN function must be enabled in the BIOS. Please refer to **Section 6.5.1** (the **Boot Settings Configuration** menu) on **page 143**.

Some of the features of the Intel® ICH9DO GbE controller are listed below.

- Supports multi speeds including 10 Mbps, 100 Mbps and 1000 Mbps
- Can operate in full-duplex mode at all supported speeds
- Can operate at half-duplex at 10 MBps and 100 MBps
- Adheres to the IEEE 802.3x Flow Control Specification.
- 64-bit address master support for system using more than 4 GB of physical memory.
- Configurable receive and transmit data FIFO, programmable in 1 KB increments.
- Intelligent interrupt generation to enhance driver performance.
- Compliance with Advanced Configuration and Power Interface
- Compliance with PCI Power Management standards.
- ACPI register set and power down functionality supporting D0 & D3 states.
- Full wake-up support (ACPI).
- Magic Packet wake-up enable with unique MAC address.
- Fragmented UDP checksum off load for package reassembly.
- Jumbo frames supported.

2.5.4.1 Intel® 82566DM Gigabit LAN Connect Device

One of the external RJ-45 Ethernet LAN connectors is interfaced to an Intel® 82566DM Gigabit LAN connect device. The Intel® 82566DM is a compact, single-port integrated physical layer (PHY) device interfaced directly to the Intel® ICH9DO Ethernet controller through the GLCI and LCI. The Intel® ICH9DO Ethernet controller has its own Media Access Controller (MAC). The Intel® 82566DM Gigabit LAN connect device is shown in **Figure 1-11**.

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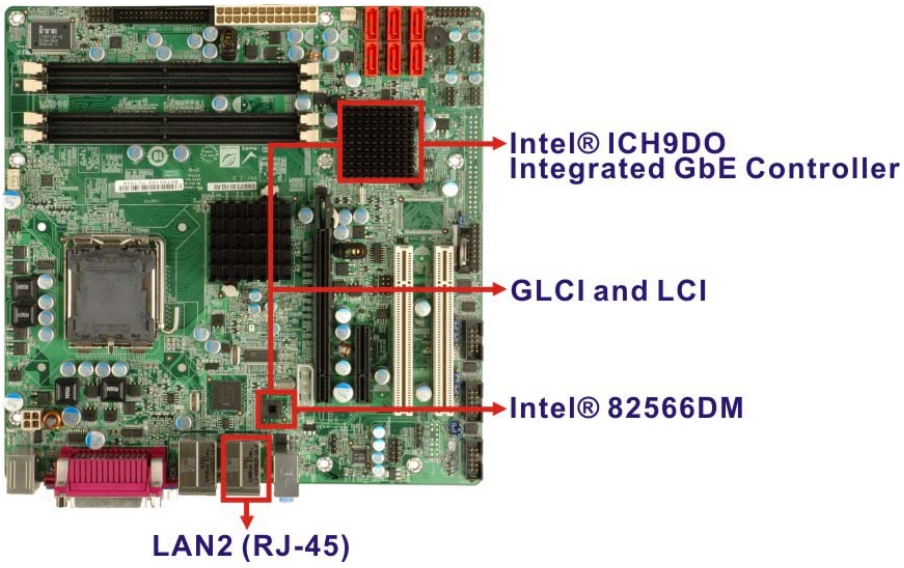

Figure 1-11: Intel® 82566DM Gigabit LAN Connect Device

Some of the features of the Intel® 82556DM are listed below:

- 10 Mbps, 100 Mbps, or 1000 Mbps
- Supports Intel® Active Management Technology
- Supports Intel® Virtualization Technology through the Intel® Virtual Gigabit Network Connection.
- Can support legacy ASF2.0.
- Shared SPI flash with system BIOS
- Integrated linear voltage regulator
- TCP/UDP checksum and segmentation offload
- Receive side scaling
- Dual TX and RX queues
- 802.1p and 802.1q

2.5.5 Intel® ICH9DO Low Pin Count (LPC) Interface

The ICH9DO LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH9DO is connected to the following components:

- BIOS chipset
- Super I/O chipset

- Trusted Platform Module (TPM) connector

2.5.6 Intel® ICH9DO PCI Interface

The PCI interface on the ICH9DO is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

- PCI Revision 2.3 compliant
- 33MHz
- 5V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to four PCI bus masters

The PCI bus masters are interfaced to the following onboard components:

- Two PCI sockets

2.5.7 Intel® ICH9DO PCIe x4 Bus

The Intel® ICH9DO Southbridge chipset has six PCIe x1 lanes. The four PCIe lanes are interfaced to one PCIe x4 slot on the MMGA motherboard.

One of the remaining PCIe x1 lanes is connected to an Intel® 82566DM GbE controller and the other PCIe x1 lane is connected to an Intel® 82573L GbE controller.

For more detailed information, please refer to **Section 2.6.3**.

2.5.8 Intel® ICH9DO Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818B real time clock (RTC) integrated into the ICH9DO. The RTC operates on a 3V battery and 32.768KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

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2.5.9 Intel® ICH9DO SATA Controller

NOTE:

That SATA drive mode is set in the BIOS. Please refer to the **Section 6.3.2** on **IDE Configuration** on **page 112** and **Section 6.3.7**on **AHCI Configuration** on **page 127**.

The ICH9DO SATA supports three modes of operation:

- ***Native IDE enabled operating system***: Two controllers enable all six ports on the bus. Controller 1 supports Port 0, Port 1, Port 2 and Port 3. Controller 2 supports Ports 4 and Port 5.
- ***Legacy operating system is used***: One controller is enabled and only supports Port 0, Port 1, Port 2 and Port 3.
- ***AHCI or RAID mode***: One controller supports all six ports including, Port 0, Port 1, Port 2, Port 3, Port 4 and Port 5.

In the AHCI or RAID mode, 3.0 Gbps data transfer speeds are supported. The SATA drive connectors are shown in **Figure 1-12**.

Figure 1-12: SATA Drive Connectors

2.5.10 Intel® ICH9DO Serial Peripheral Interface (SPI) BIOS

The SPI is connected to an SPI BIOS chip. A licensed copy of AMI BIOS is preinstalled on the SPI BIOS chip.

2.5.11 Intel® ICH9DO USB Controller

2.5.11.1 Intel® ICH9DO USB Controller Overview

The ICH9DO comprises six full/low speed USB controllers that support the standard Universal Host Controller Interface (UHCI) Revision 1.1. Each controller supports two USB devices ensuring up to twelve USB 1.1 devices can be connected to the MMGA.

The ICH9DO also comprises two high-speed Enhanced Host Controller Interface (EHCI) controllers. Each EHCI controller supports six USB 2.0 devices ensuring twelve USB 2.0 devices can be connected to the MMGA. EHCI controllers facilitate data transfer speeds of 480 Mbps

Port routing logic on the ICH9DO determines whether a UHCI or an EHCI controller controls a USB port.

2.5.11.2 MMGA USB Implementation

All twelve of the Intel® ICH9DO USB ports are implemented on the MMGA. Four USB ports (USB Port 1 to USB Port 4) are connected to four external connectors and eight USB ports (USB Port 5 to USB Port 12) are connected to four 8-pin onboard pin-headers. See **Figure 1-13**.

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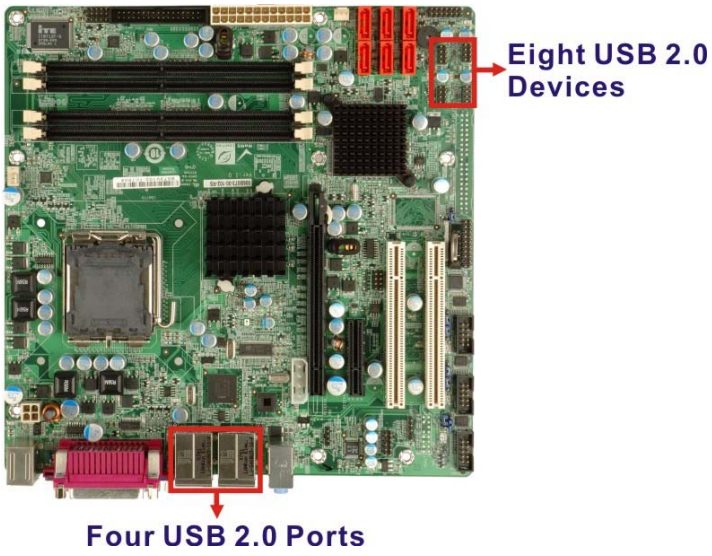

Figure 1-13: Onboard USB Implementation

2.6 MMGA PCIe Bus Components

2.6.1 PCIe Bus Overview

The MMGA has one PCIe x16 channel from the Intel® Q35 Northbridge and six PCIe x1 lanes from the Intel® ICH9DO Southbridge. The PCIe bus lanes are interfaced to the following devices.

- One PCIe x16 lane is connected to one PCIe x16 graphics card
- Four PCIe x1 lanes are connected to one PCIe x4 expansion card
- One PCIe x1 lane are connected to one Intel® PCIe GbE device
- One PCIe x1 is shared with the Intel® ICH9DO Gigabit LAN Connect Interface (GLCI), which is connected to a Intel® 82566DM Gigabit platform LAN connect device

2.6.2 PCIe x16 Slot

The Intel® Q35 Northbridge chipset has one PCIe x16 port reserved for a PCIe x16 graphics card. The PCIe x16 lane is interfaced to a PCIe x16 slot on the MMGA motherboard. The PCIe x16 graphics card is then installed on the PCIe x16 slot on the motherboard. The PCIe x16 edge connector is shown in **Figure 1-14**.

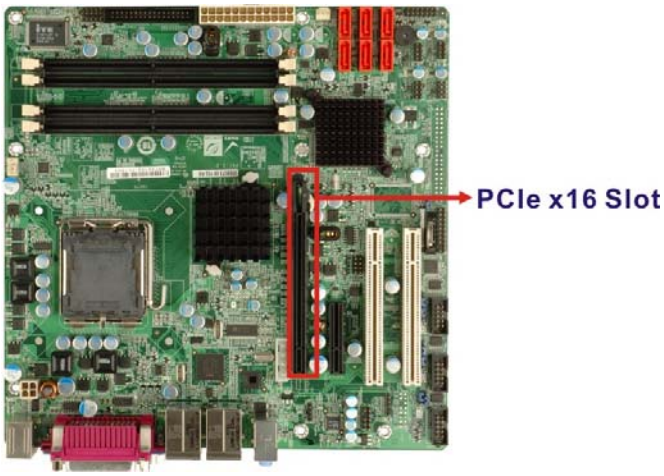

Figure 1-14: PCIe x16 Slot

2.6.3 PCIe x4 Slot

Four of the six PCIe x1 expansion channels on the MMGA are interfaced to one PCIe x4 slot on the MMGA motherboard. The PCIe x4 slot is shown in **Figure 1-15**.

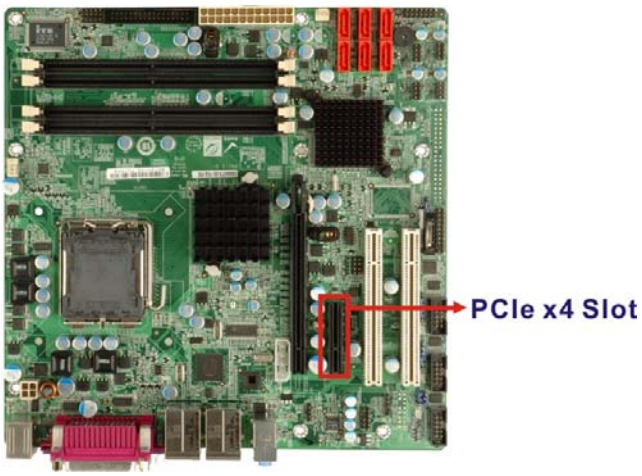

Figure 1-15: PCIe x4 Slot

2.6.4 Intel® 82573L PCIe GbE Controller

An RJ-45 Ethernet LAN connector is interfaced directly to an Intel® 82573L PCIe GbE controller. The Intel® 82573L PCIe GbE controller is a compact, single-port integrated physical layer (PHY) device with its own Memory Access Controller (MAC) and interfaced

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to the Intel® ICH9DO Southbridge through a PCIe x1 lane. The Intel® 82573L GbE controllers is shown in **Figure 1-16** below.

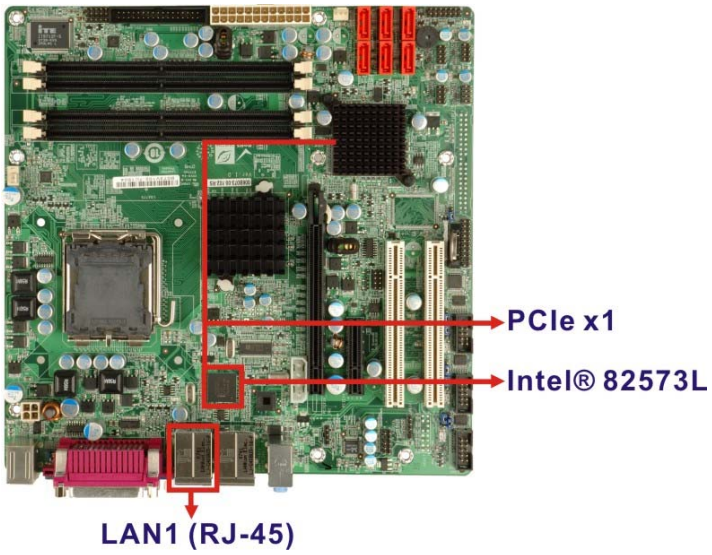

Figure 1-16: Intel® 82573L PCIe GbE Controller

Some of the features of the Intel® 82573L are listed below:

- 2 Gbps peak bandwidth per direction
- PCI Express Rev 1.0a specification
- High bandwidth density per pin
- Wide,pipelined internal data path architecture
- Optimized transmit (Tx) and receive (Rx) queues
- 32 KB configurable Rx and Tx first-in/first-out (FIFO)
- IEEE 802.3x*-compliant flow-control support with software controllable pause times and threshold values
- Programmable host memory Rx buffers (256 B-16 KB)
- Descriptor ring management hardware for Tx and Rx
- Mechanism for reducing interrupts from Tx/Rx operations
- Integrated PHY for 10/100/1000 Mbps (full- and half-duplex)
- IEEE 802.3ab* auto-negotiation support
- IEEE 802.3ab PHY compliance and compatibility
- Tx/Rx IP,TCP,and UDP checksum offloading
- Tx TCP segmentation

- IEEE 802.1q* Virtual Local Area Network (VLAN) support with VLAN tag insertion, stripping, and packet filtering for up to 4096 VLAN tags
- Boot ROM Preboot eXecution Environment (PXE) Flash interface support
- SDG 3.0,WfM 3.0 and PC2001 compliant
- Wake on LAN support

2.7 PCI Bus Components

2.7.1 PCI Bus Overview

The PCI bus is connected to the components listed below:

- Two PCI slots

The PCI bus complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations.

2.7.2 PCI Slots

The Intel® ICH9DO Southbridge integrates a PCI arbiter that supports up to four PCI Masters thereby enabling the MMGA to support an additional two PCI bus Masters. The PCI bus on the MMGA is interfaced to two PCI slots thereby connecting the PCI expansion boards to the Intel® ICH9DO Southbridge. The PCI slots are shown in **Figure 1-17**.

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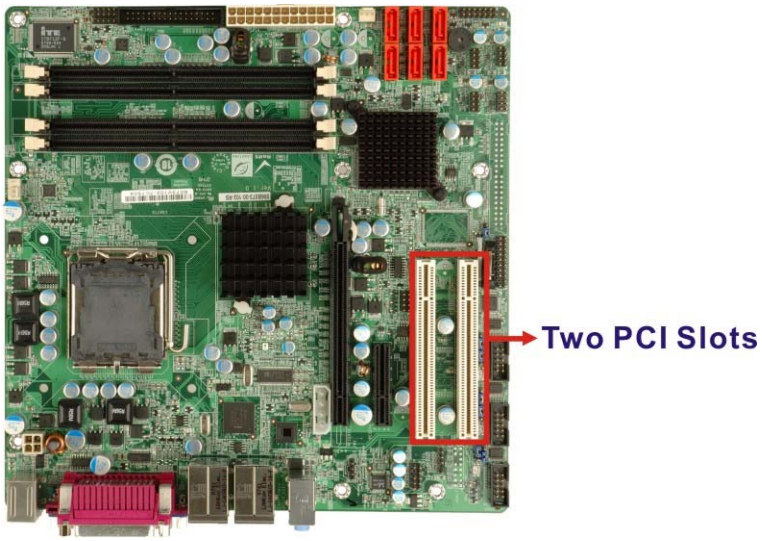

Figure 1-17: PCI Slots

2.8 LPC Bus Components

2.8.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- TPM module connector
- Super I/O chipset
- Fintek F81216DG LPC Serial Port Chipset

2.8.2 TPM Module

A TPM connector on the MMGA is interfaced to the Intel® ICH9DO Southbridge through the LPC bus. The TPM connector is shown in **Figure 1-18** below.

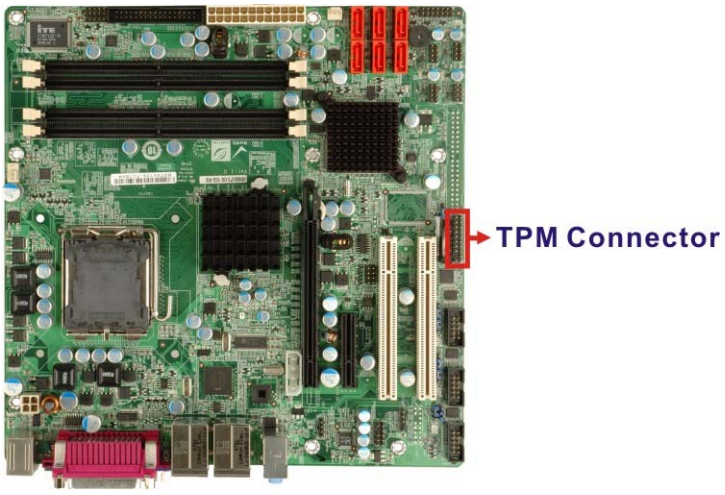

Figure 1-18: TPM Connector

The Intel® ICH9DO Southbridge supports TPM version 1.1 and TPM version 1.2 devices for enhanced security. Three types of TPM compatible modules are listed below:

- Infineon TPM module
- Sinosun TPM module
- Winbond TPM module

2.8.3 Super I/O chipset

The ITE IT8712F Super I/O chipset is connected to the Intel® ICH9DO Southbridge through the LPC bus. ITE IT8712F Super I/O chipset is shown in **Figure 1-19** below.

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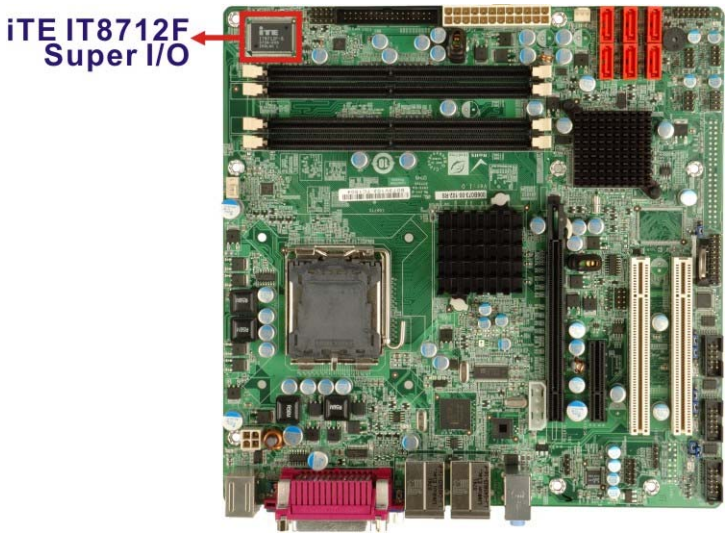

Figure 1-19: ITE IT8712F Super I/O

The ITE IT8712F is an LPC interface-based Super I/O device that comes with an integrated Environment Controller. Some of the features of the ITE IT8712F chipset are listed below:

- PC98/99/2001, ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- Single +5V Power Supply
- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Keyboard Controller
- Watchdog Timer
- Serial IRQ Support
- Vbat & Vcch Support
- Single +5V Power Supply

Some of the Super I/O features are described in more detail below:

2.8.3.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.0. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.8.3.2 Super I/O 16C550 UARTs

The onboard Super I/O has two integrated 16C550 UARTs that can support the following:

- one standard serial port (COM1)
- IrDa 1.0 and ASKIR protocols(IR1)

The Fintek F81216DG LPC Serial Port chipset connected to the LPC bus provided connectivity to another three serial port connectors (COM2, COM3 and COM4). For further details on the Fintek F81216DG serial port controller, please refer to **Section 2.8.4**.

2.8.3.3 Super I/O Enhanced Hardware Monitor

The Super I/O Enhanced Hardware Monitor monitors three thermal inputs, VBAT internally, and eight voltage monitor inputs. These hardware parameters are reported in the BIOS and can be read from the BIOS Hardware Health Configuration menu.

2.8.3.4 Super I/O Floppy Disk Drive (FDD) Controller

The Super I/O FDD controller is compatible with the following specifications.

- Enhanced digital data separator
- Supports automatic write protection via software
- Supported capacities:
  - 360K
  - 720K
  - 1.2M
  - 1.44M
  - 2.88M
- 3-mode FDD supported

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The FDD controller is interfaced to a FDD connected to the FDD connector on the MMGA.

2.8.3.5 Super I/O Fan Speed Controller

The Super I/O fan speed controller enables the system to monitor the speed of the fan. One of the pins on the fan connector is reserved for fan speed detection and interfaced to the fan speed controller on the Super I/O. The fan speed is then reported in the BIOS.

2.8.3.6 Super I/O Keyboard/Mouse Controller

The Super I/O keyboard/mouse controller can execute the 8042 instruction set. Some of the keyboard controller features are listed below:

- The 8042 instruction is compatible with a PS/2 keyboard and PS/2 mouse
- Gate A20 and Keyboard reset output
- Supports multiple keyboard power on events

Supports mouse double-click and/or mouse move power on events.

2.8.3.7 Super I/O GPIO Ports

The Super I/O has 48 programmable GPIO ports of which 8 are implemented on the MMGA. The GPIO connector has 8 programmable bits, 4-bit input and 4-bit output.

2.8.3.8 Super I/O Infrared

The Super I/O has dedicated infrared (IrDA) pins that are interfaced to an IrDA connector. The IrDA connector is compatible with the following standards:

- ASKIR
- SIR

2.8.3.9 Super I/O Parallel Port

The Super I/O parallel port (LPT) is compatible with the following LPT specifications.

- SPP compatible bi-directional parallel port
- Enhanced Parallel Port (EPP) mode supported. Compatible with IEEE 1284

specifications

- Extended Capability Port (ECP) mode supported. Compatible with IEEE 1284 specifications
- Enhanced printer port back-drive current reduction
- Printer power-on damage reduction
- Supports POST (Power-On Self Test) Data Port

The parallel port controller is connected to an external DB-26 LPT connector.

2.8.3.10 Super I/O Watchdog Timer

The super I/O watchdog timer has a maximum time resolution of 1 minute or 1 second with a maximum or either 65,535 minutes or 65,535 seconds.

2.8.4 Fintek F81216DG LPC Serial Port Chipset

The Fintek F81216DG chipset enables the addition of three additional UART serial ports (COM2,COM3 and COM4). UART includes 16-byte send/receive FIFO. The Fintek serial port chipset is interfaced to the Southbridge chipset through the LPC bus. Some of the features of the Fintek chipset are listed below:

- Supports LPC interface
- Totally provides 4 UART (16550 asynchronous) ports
  - 3 x Pure UART
  - 1 x UART+IR
- One Watch dog timer with WDTOUT# signal
- One Frequency input 48MHz
- Powered by 3Vcc

2.9 Ethernet LAN Controllers

The MMGA motherboard has two GbE controllers. The MMGA LAN connections are shown in **Figure 1-20**.

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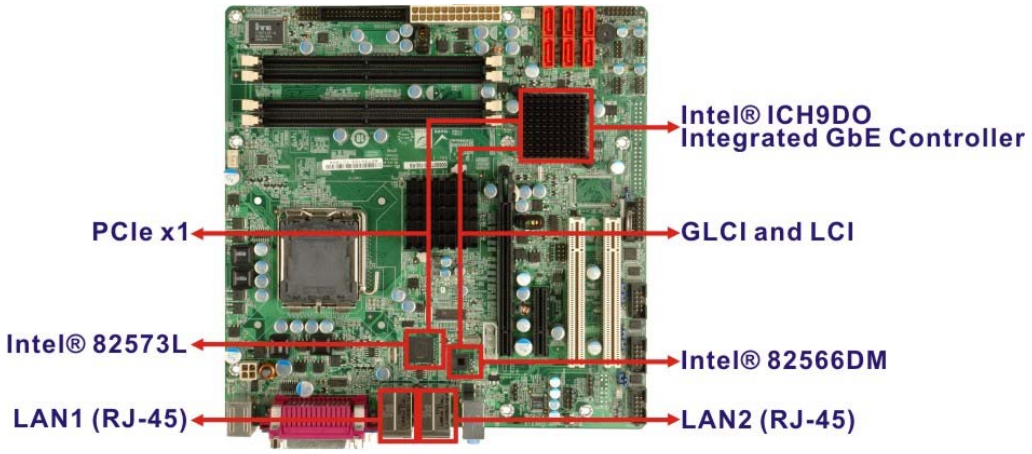

Figure 1-20: LAN Connections

The first GbE controller, is an Intel® 82537L PCIe GbE controller and is the interface between the Intel® ICH9DO Southbridge controller and the LAN1 RJ-45 Ethernet connector.

The second GbE controller is integrated on the Intel® ICH9DO Southbridge and interfaced to the LAN2 RJ-45 Ethernet LAN connector through an Intel® 82566DM Gigabit Platform LAN Connect device. The Intel® 82566DM is connected directly to the GbE controller on the Intel® ICH9DO Southbridge through the GLCI and LCI, which is shared with the PCIe x1 port 6.

Both of these Ethernet controllers have been described in detail in earlier sections. For further details please refer to the relevant sections:

- Intel® ICH9DO Ethernet controller (**Section 2.5.4**)
- Intel® 82566DM Gigabit Platform LAN Connect device (**Section 2.5.4.1**)
- Intel® 82537L PCIe GbE controller (**Section 2.6.4**)

2.10 Environmental and Power Specifications

2.10.1 System Monitoring

Three thermal inputs on the MMGA Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System Temperature #1
- System Temperature #2

Five voltage inputs on the MMGA Super I/O Enhanced Hardware Monitor monitors the following voltages:

- CPU Core
- DDR2 1.8V
- +3.3V
- +5V
- +12V
- FSB 1.2V
- +1.5V
- +1.25V
- VBAT

The MMGA Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan Speed
- System Fan Speed

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.10.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the MMGA are listed below.

- Minimum Operating Temperature: 0ºC (32°F)

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- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the Northbridge and Southbridge chipsets to ensure the operating temperature of these chips remain low.

2.10.3 Power Consumption

Table 1-4 shows the power consumption parameters for the MMGA running 3D Mark® 2001 SE330 with a 3.0 GHz E6850 Intel® Core™2 Duo processor with four 2.0 GB 800MHz DDR2 DIMMs.

Voltage	Current
+3.3V	2.41A
+5.0V	5.71A
+12V	3.69A
5Vsb	0.13A

Table 1-4: Power Consumption

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Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the MMGA may result in permanent damage to the MMGA and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the MMGA. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the MMGA, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***: Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the MMGA, place it on an antic-static pad. This reduces the possibility of ESD damaging the MMGA.
- ***Only handle the edges of the PCB***: When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the MMGA is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the MMGA does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

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3.3 Unpacking Checklist

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact CyberResearch, Inc.

3.3.1 Package Contents

The MMGA is shipped with the following components:

Quantity	Item and Part Number	Image
1	MMGA motherboard	
1	Dual RS-232 cable	
6	SATA cables	
3	SATA power cables	

1	Mini jumper Pack	
1	Utility CD	
1	USB cable	

Table 1-5: Package List Contents

3.4 Optional Items

CPU cooling kit	
CPU cooling kit	

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Chapter

4

Connector Pinouts

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4.1 Peripheral Interface Connectors

Section 4.1.2 shows peripheral interface connector locations. **Section 4.1.2** lists all the peripheral interface connectors seen in **Section 4.1.2**.

4.1.1 MMGA Layout

Figure 1-21 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

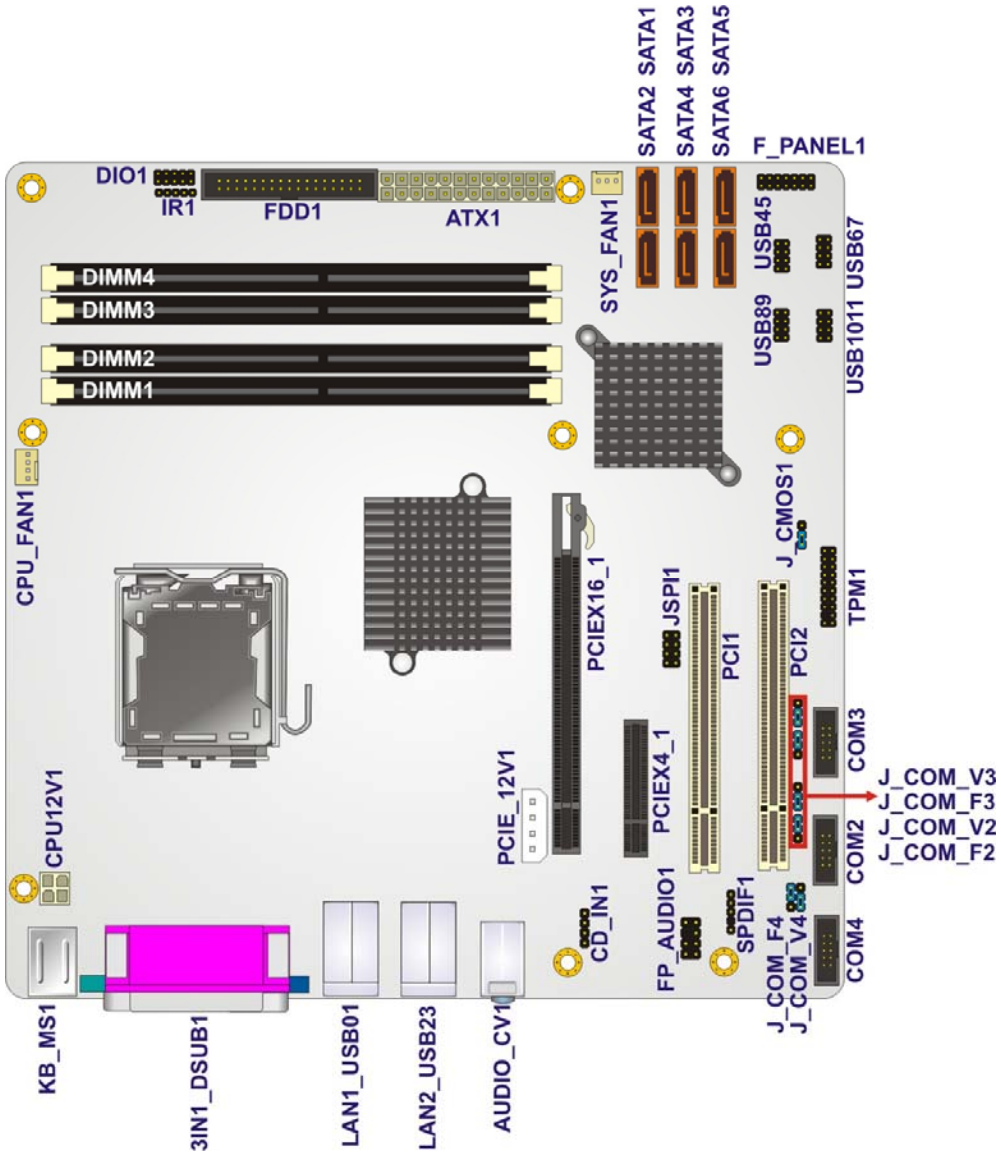

Figure 1-21: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 1-6 shows a list of the peripheral interface connectors on the MMGA. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX power connector	24-pin ATX connector	ATX1
CD in connector	4-pin header	CD_IN1
Cooling fan connector, CPU	4-pin wafer	CPU_FAN1
Cooling fan connector, System	3-pin wafer	SYS_FAN1
CPU power connector	4-pin wafer	CPU12V1
Digital input/output connector	10-pin header	DIO1
DIMM socket	240-pin socket	DIMM1
DIMM socket	240-pin socket	DIMM2
DIMM socket	240-pin socket	DIMM3
DIMM socket	240-pin socket	DIMM4
Floppy drive connector	34-pin box header	FDD1
Front audio connector	10-pin header	FP_AUDIO1
Front panel connector	14-pin header	F_PANEL1
Infrared (IrDA) connector	5-pin header	IR1
PCI socket	120-pin slot	PCI1
PCI socket	120-pin slot	PCI2
PCIe x16 socket	164-pin slot	PCIEX16
PCIe x4 socket	64-pin slot	PCIEX4
PCIe power connector	4-pin wafer	PCIE_12V1

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Serial ATA drive connector	7-pin SATA	SATA1
Serial ATA drive connector	7-pin SATA	SATA2
Serial ATA drive connector	7-pin SATA	SATA3
Serial ATA drive connector	7-pin SATA	SATA4
Serial ATA drive connector	7-pin SATA	SATA5
Serial ATA drive connector	7-pin SATA	SATA6
Serial port connector (COM2)	10-pin box header	COM2
Serial port connector (COM3)	10-pin box header	COM3
Serial port connector (COM4)	10-pin box header	COM4
SPDIF connector	5-pin header	SPDIF1
SPI flash connector	8-pin header	JSPI1
TPM connector	20-pin header	TPM1
USB connector	8-pin header	USB45
USB connector	8-pin header	USB67
USB connector	8-pin header	USB89
USB connector	8-pin header	USB1011

Table 1-6: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 1-7 lists the rear panel connectors on the MMGA. Detailed descriptions of these connectors can be found in **Section 4.3**.

Connector	Type	Label
Audio connector	Audio jack	AUDIO_CV1
Ethernet and dual USB combo connector	RJ-45 and two USB	LAN1_USB01
Ethernet and dual USB combo connector	RJ-45 and two USB	LAN2_USB23
Mouse or keyboard connector	PS/2	KB_MS1
Parallel port, serial port and VGA combo connector	DB-25, DB-9 and DB-15	3IN1_DSUB1

Table 1-7: Rear Panel Connectors

4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the MMGA.

4.2.1 ATX Power Connector

CN Label: **ATX1**

CN Type: 24-pin ATX (2x12)

CN Location: See **Figure 1-22**

CN Pinouts: See **Table 1-8**

The ATX connector is connected to an external ATX power supply. Power is provided to the system, from the power supply through this connector.

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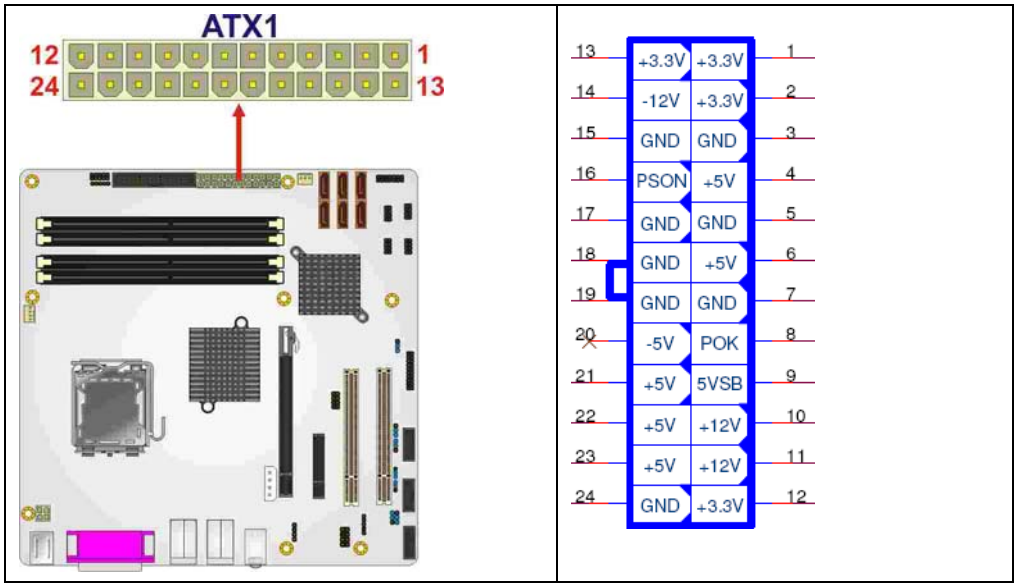

Figure 1-22: ATX Power Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

Table 1-8: ATX Power Connector Pinouts

4.2.2 Audio CD In Connector

CN Label: **CD_IN1**

CN Type: 4-pin header

CN Location: See **Figure 1-23**

CN Pinouts: See **Table 1-9**

The 4-pin audio CD in connector is connected to an external audio CD device for the input and output of audio signals from a CD player to the system.

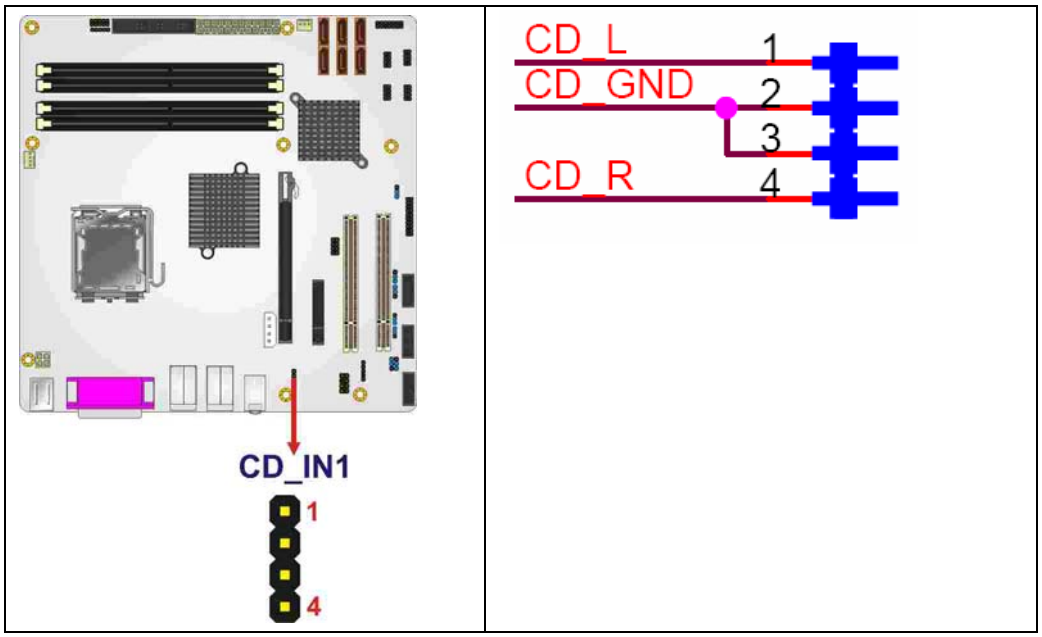

Figure 1-23: Audio CD In Connector Pinouts (4-pin)

PIN NO.	DESCRIPTION
1	CD Signal (Left)
2	Ground
3	Ground
4	CD Signal (Right)

Table 1-9: Audio CD In Connector Pinouts

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4.2.3 CPU Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin power connector (1x4)

CN Location: See **Figure 1-24**

CN Pinouts: See **Table 1-10**

The 4-pin CPU power connector is connected to an ATX power supply and powers the CPU.

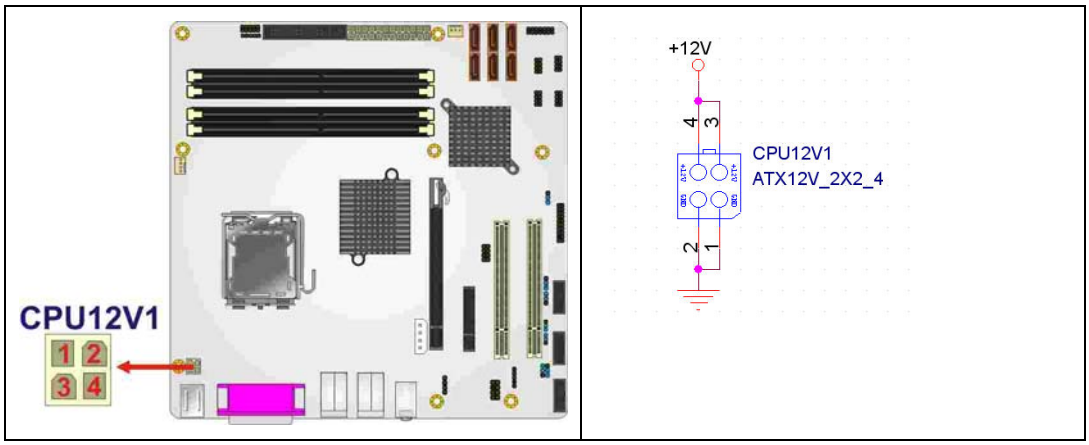

Figure 1-24: CPU Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	+12V
4	+12V

Table 1-10: CPU Power Connector Pinouts

4.2.4 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 1-25**

CN Pinouts: See **Table 1-11**

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable. To see details on how to program the DIO chip, please refer to **Appendix C**.

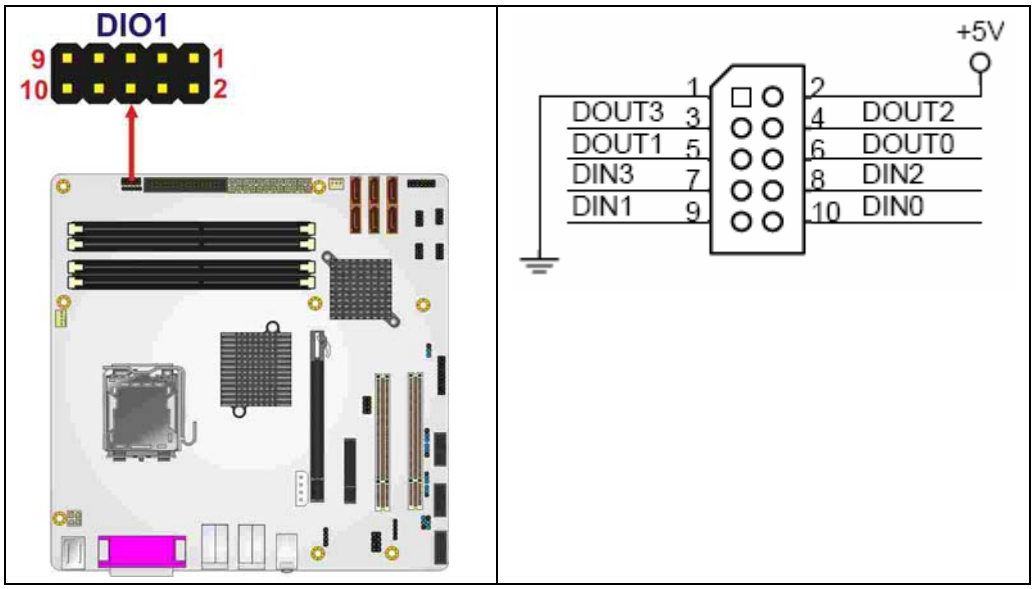

Figure 1-25: DIO Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Ground	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 1-11: DIO Connector Pinouts

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4.2.5 Fan Connector, CPU (12V, 4-pin)

CN Label: **CPU_FAN1**

CN Type: 4-pin header (1x4)

CN Location: See **Figure 1-26**

CN Pinouts: See **Table 1-12**

The CPU cooling fan connector provides a 12V, 500mA current to a CPU cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

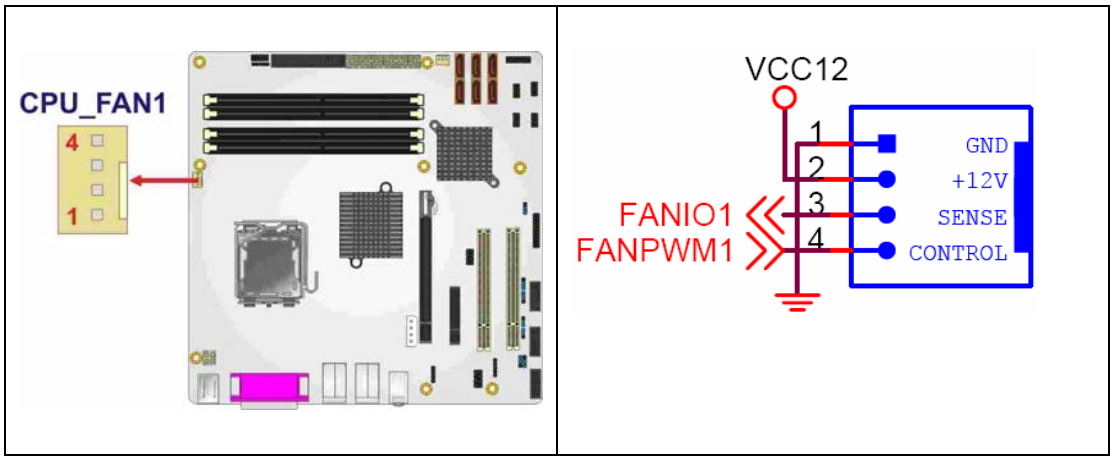

Figure 1-26: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12VCC
3	Rotation Signal
4	Control

Table 1-12: +12V Fan Connector Pinouts

4.2.6 Fan Connector, System (+12V, 3-pin)

CN Label: **SYS_FAN1**

CN Type: 3-pin header (1x3)

CN Location: See **Figure 1-27**

CN Pinouts: See **Table 1-13**

The system cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

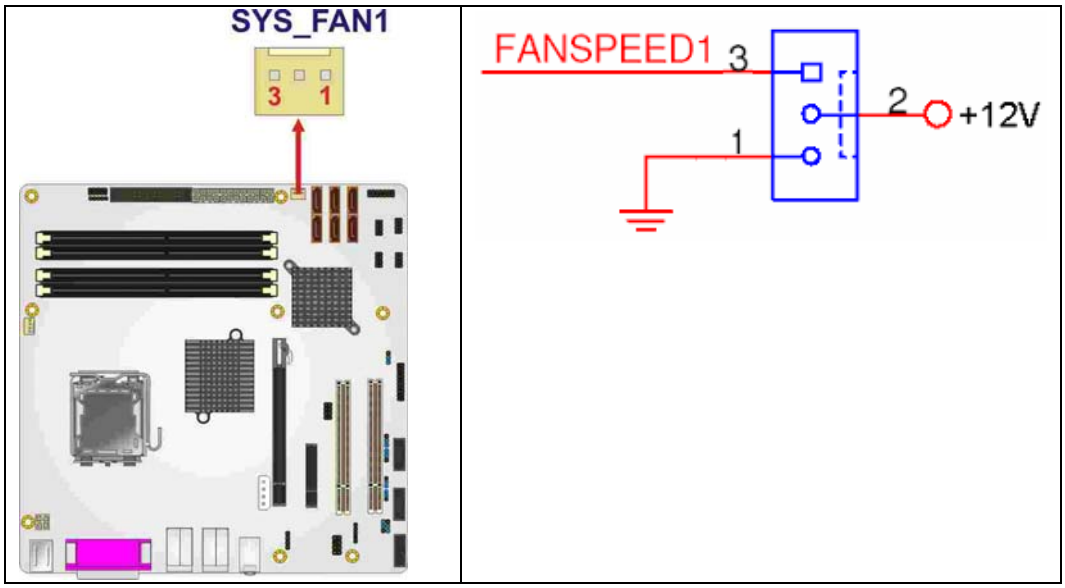

Figure 1-27: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	Rotation Signal

Table 1-13: +12V Fan Connector Pinouts

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4.2.7 Floppy Disk Connector (34-pin)

CN Label: **FDD1**

CN Type: 34-pin header (2x17)

CN Location: See **Figure 1-28**

CN Pinouts: See **Table 1-14**

The floppy disk connector is connected to a floppy disk drive.

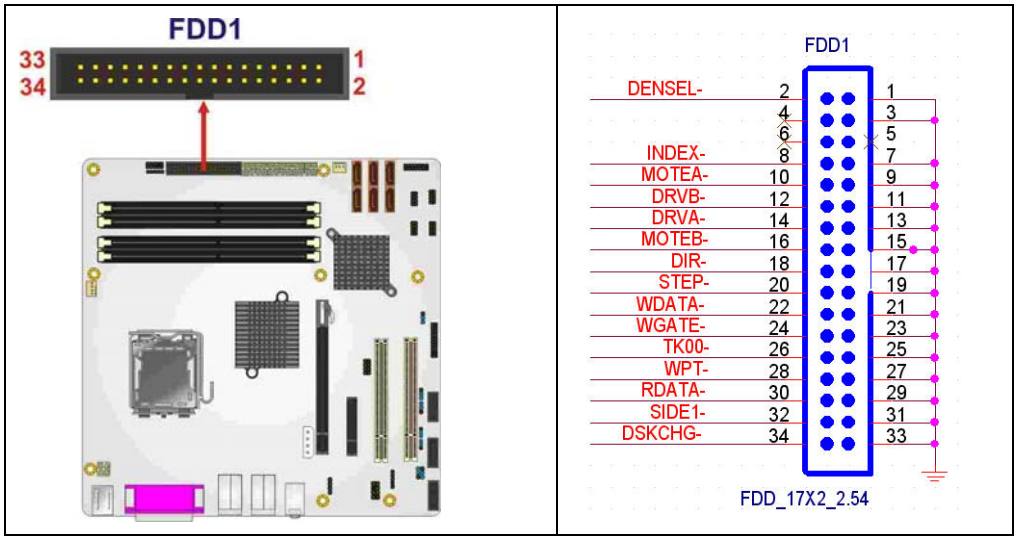

Figure 1-28: 34-pin FDD Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	Density Select#
3	GND	4	N/C
5	N/C	6	N/C
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#
11	GND	12	DRIVE ENABLE B#
13	GND	14	DRIVE ENABLE A#
15	GND	16	MOTOR ENABLE B#
17	GND	18	DIRECTION#

19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#
29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#
33	GND	34	DISK CHANGE#

Table 1-14: 34-pin FDD Connector Pinouts

4.2.8 Front Audio Connector

CN Label: **FP_AUDIO1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 1-29**

CN Pinouts: See **Table 1-15**

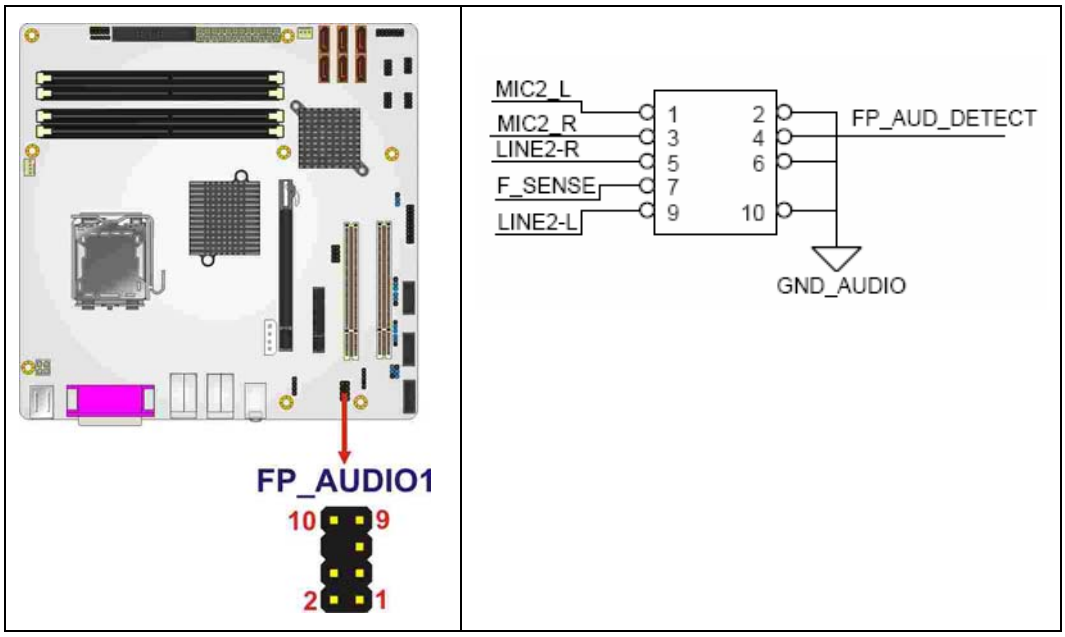

Figure 1-29: Front Audio Connector Location (10-pin)

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PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MIC_L	2	GND
3	MIC_R	4	Audio Detect
5	LINE2-R	6	GND
7	Jack Detection	8	N/C
9	LINE2-L	10	GND

Table 1-15: Front Audio Connector Pinouts

4.2.9 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header (2x7)

CN Location: See **Figure 1-30**

CN Pinouts: See **Table 1-16**

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power LED
- Speaker
- Power button
- Reset
- HDD LED

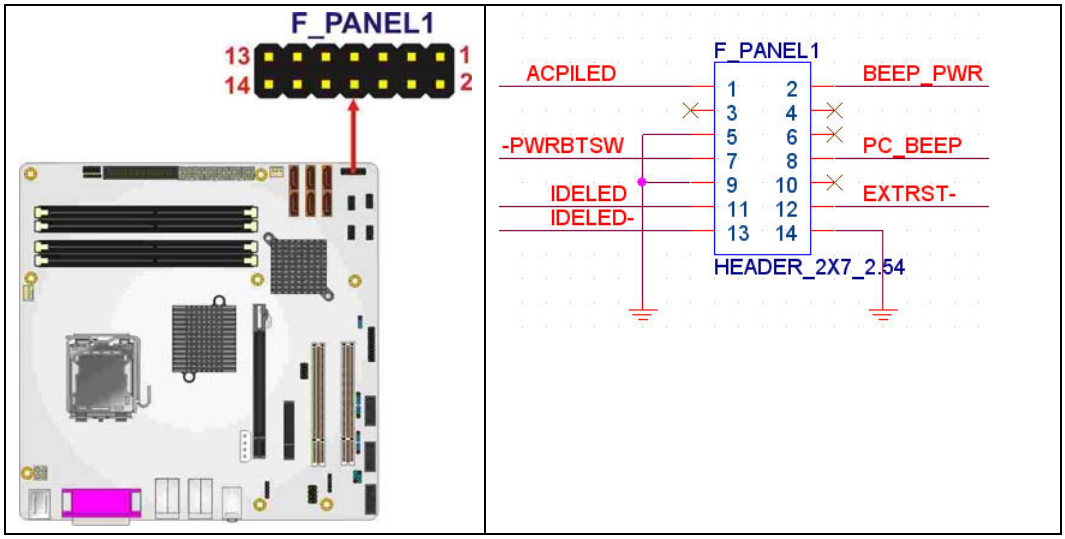

Figure 1-30: Front Panel Connector Pinout Locations (14-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	+5V	Speaker	2	+5V
	3	N/C		4	N/C
	5	GROUND		6	N/C
Power	7	PWRBTN+		8	SPEAKER
Button	9	PWRBTN-	Reset	10	N/C
HDD LED	11	+5V		12	RESET-
	13	IDE LED-		14	GROUND

Table 1-16: Front Panel Connector Pinouts (14-pin)

4.2.10 Infrared Interface Connector

CN Label: **IR1**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 1-31**

CN Pinouts: See **Table 1-17**

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.

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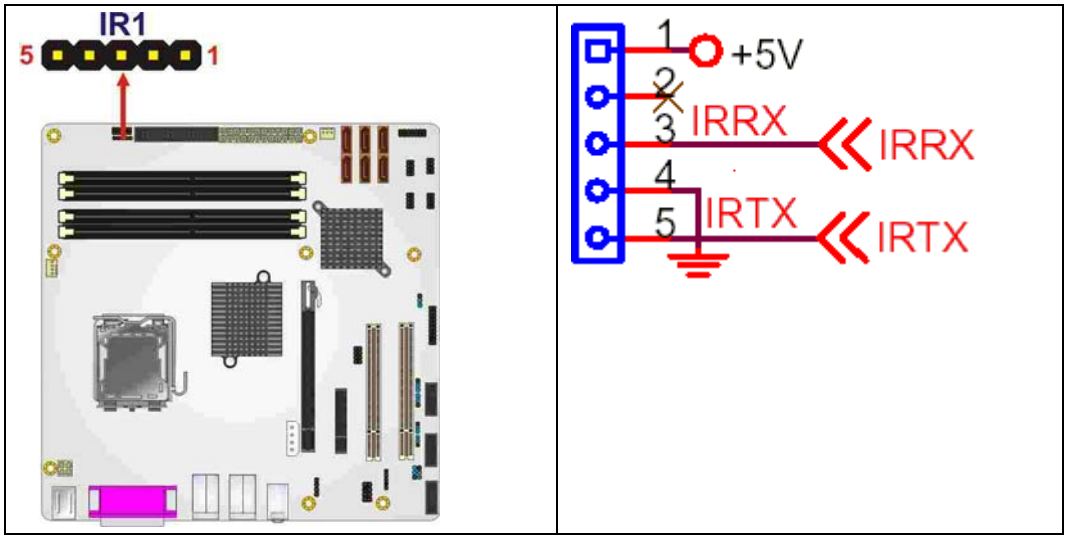

Figure 1-31: Infrared Connector Location

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 1-17: Infrared Connector Pinouts

4.2.11 PCIe Power Connector

CN Label: **PCIE_12V1**

CN Type: 4-pin wafer (1x4)

CN Location: See **Figure 1-32**

CN Pinouts: See **Table 1-18**

The 4-pin PCIe power connector is connected to a power supply to power the PCIe expansion card.

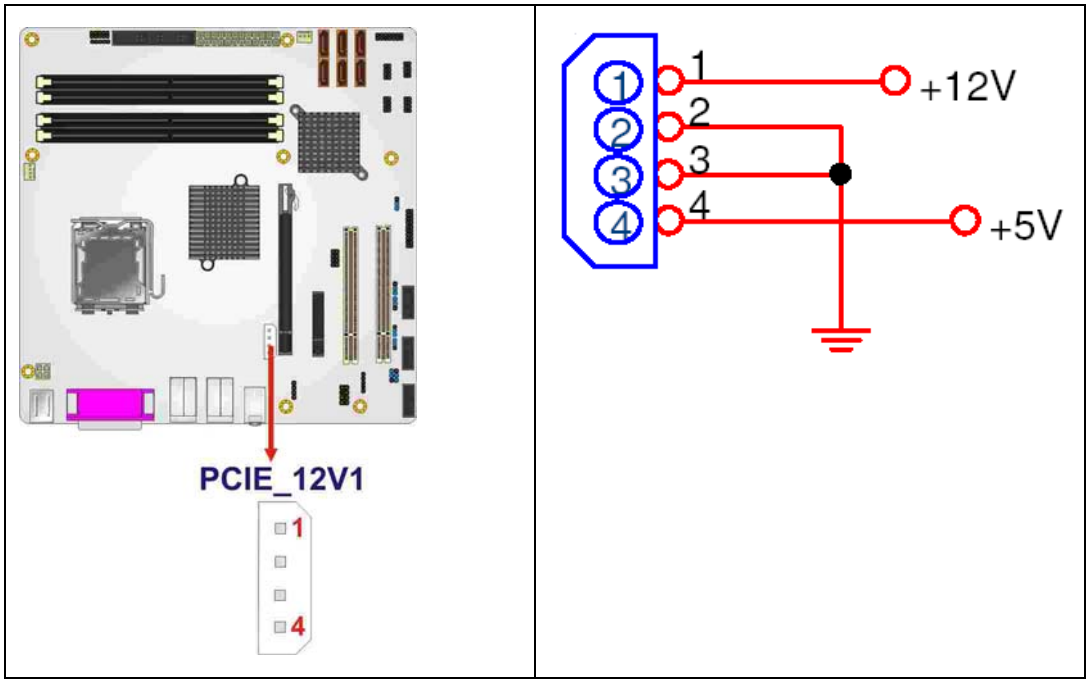

Figure 1-32: PCIe Power Connector Location

PIN NO.	DESCRIPTION
1	+12V
2	GND
3	GND
4	+5V

Table 1-18: PCIe Power Connector Pinouts

4.2.12 SATA Drive Connectors

CN Label: **SATA1**, **SATA2**, **SATA3**, **SATA4**, **SATA5** and **SATA6**

CN Type: 7-pin SATA drive connectors (1x7)

CN Location: See **Figure 1-33**

CN Pinouts: See **Table 1-19**

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The six SATA drive connectors are each connected to second generation SATA drives. Second generation SATA drives transfer data at speeds as high as 3.0 Gbps. The SATA drives can be configured in a RAID configuration.

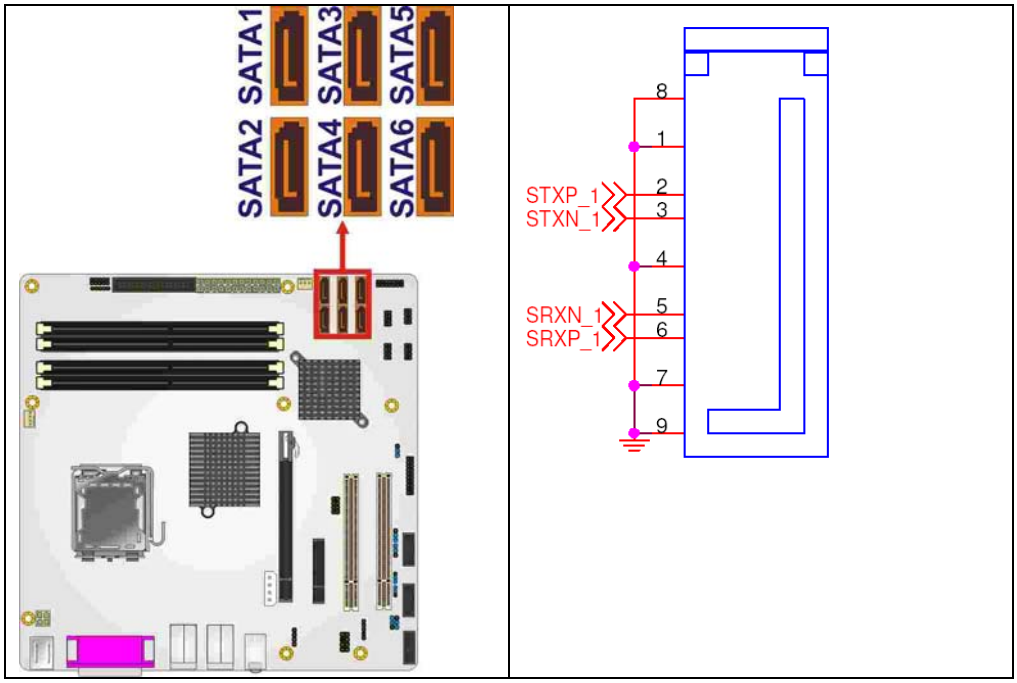

Figure 1-33: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 1-19: SATA Drive Connector Pinouts

4.2.13 Serial Port Connector (COM2, COM 3 and COM4)

CN Label: **COM2**, **COM3** and **COM4**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 1-34**

CN Pinouts: See **Table 1-20**

The 10-pin serial port connector provides a second RS-232 serial communications channel. The serial port connectors can be connected to external RS-232 serial port devices.

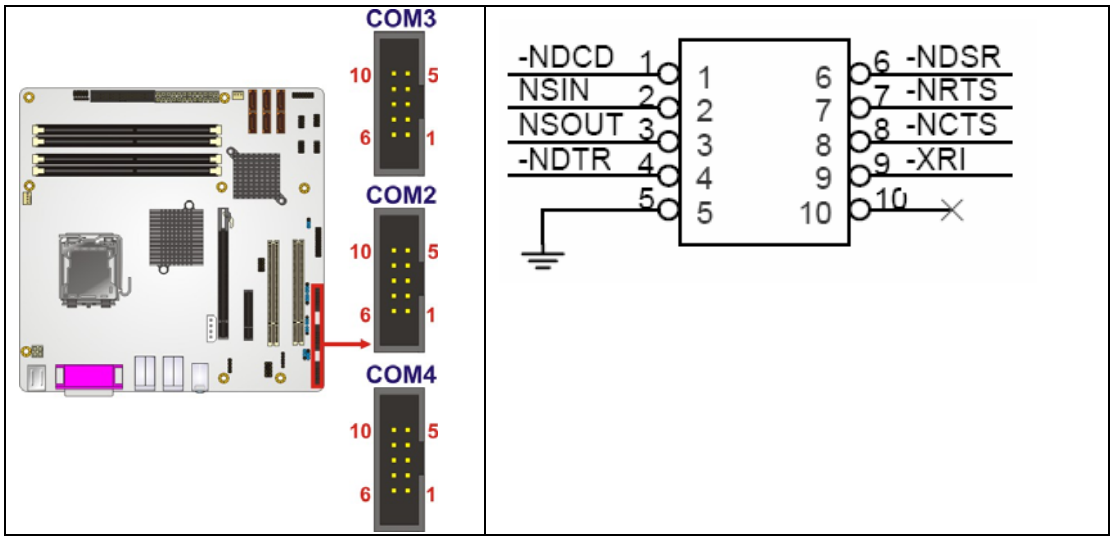

Figure 1-34: Serial Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data Carrier Direct (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request To Send (RTS)
5	Transmit Data (TXD)	6	Clear To Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	N/C

Table 1-20: Serial Connector Pinouts

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4.2.14 SPDIF Connector

CN Label: **SPDIF1**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 1-35**

CN Pinouts: See **Table 1-21**

Use the SPDIF connector to connect digital audio devices to the system.

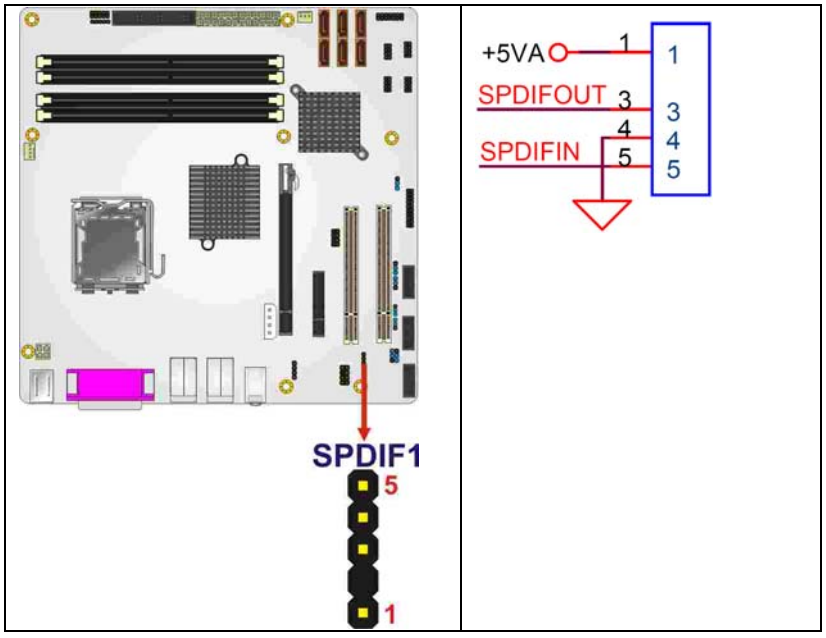

Figure 1-35: SPDIF Connector Location

PIN	DESCRIPTION
1	5V
2	NC
3	SPDIF OUT
4	GND
5	SPDIF IN

Table 1-21: SPDIF Connector Pinouts

4.2.15 Trusted Platform Module (TPM) Connector

CN Label: **TPM1**

CN Type: 40-pin header (2x20)

CN Location: See **Figure 1-36**

CN Pinouts: See **Table 1-22**

The Trusted Platform Module (TPM) connector secures the system on bootup. An optional TPM can be connected to the TPM connector.

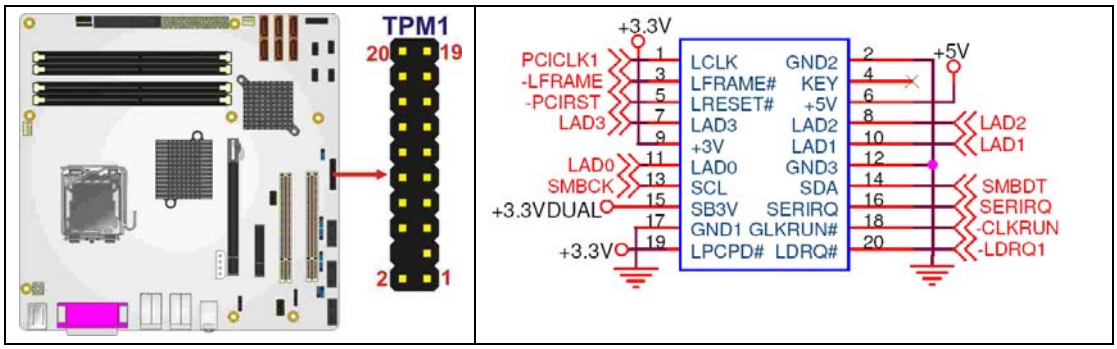

Figure 1-36: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FWHPCLK	2	GND
3	LFRAME#	4	KEY
5	PCIRST#	6	VCC
7	LAD3	8	LAD2
9	VCC3	10	LAD1
11	LAD0	12	GND
13	SMBCLK	14	SMBDATA
15	3VDUAL	16	SERIRQ
17	GND	18	CLKRUN#
19	LPCPD#	20	LDRQ#

Table 1-22: TPM Connector Pinouts

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4.2.16 USB Connectors (Internal)

CN Label: **USB45**, **USB67**, **USB89** and **USB1011**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 1-37**

CN Pinouts: See **Table 1-23**

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

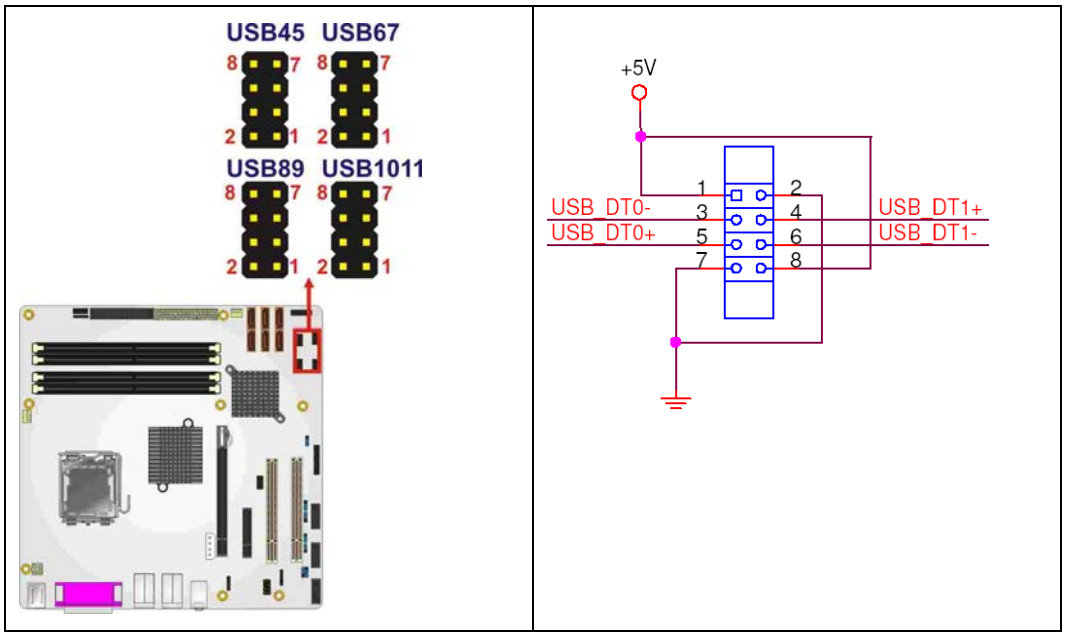

Figure 1-37: USB Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 1-23: USB Port Connector Pinouts

4.3 External Peripheral Interface Connector Panel

Figure 1-38 shows the MMGA external peripheral interface connector (EPIC) panel. The MMGA EPIC panel consists of the following:

- 3 x Audio jacks
- 1 x Parallel port
- 2 x PS/2 keyboard/mouse connectors
- 2 x RJ-45 LAN connectors
- 1 x Serial port connector
- 4 x USB 2.0 ports
- 1 x VGA connector

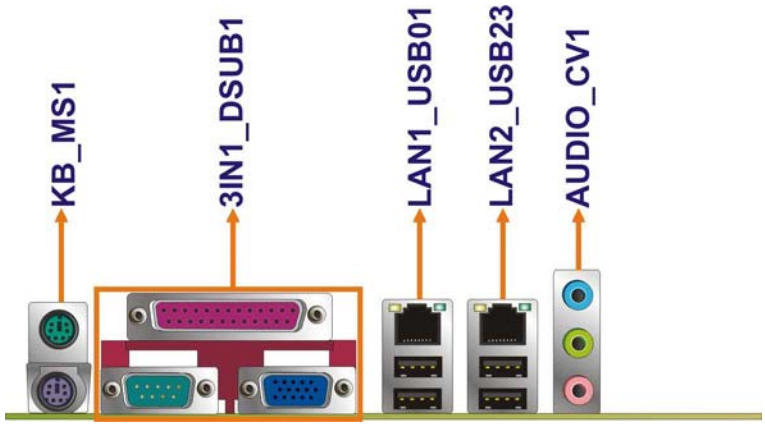

Figure 1-38: MMGA External Peripheral Interface Connector

4.3.1 Audio Connectors

CN Label: **AUDIO_CV1**

CN Type: 3 x audio jacks

CN Location: See **Figure 1-38**

The three audio jacks on the external audio connector enable the MMGA to be connected to external audio devices as specified below.

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio

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devices.

- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

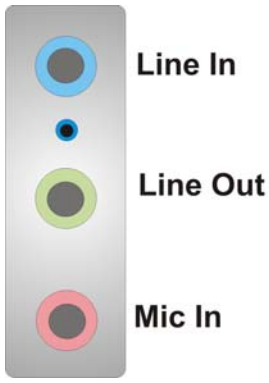

Figure 1-39: Audio Connector

4.3.2 Keyboard/Mouse Connector

CN Label:	**KB_MS1**
CN Type:	Dual PS/2
CN Location:	See **Figure 1-38**
CN Pinouts:	See **Figure 1-40** and **Table 1-24**

The MMGA keyboard and mouse connectors are standard PS/2 connectors.

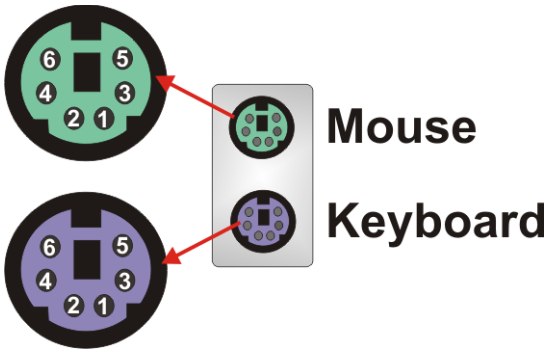

Figure 1-40: PS/2 Pinouts

PIN	DESCRIPTION
1	DATA
2	NC
3	GND
4	VCC5
5	CLK
6	NC

Table 1-24: PS/2 Connector Pinouts

4.3.3 LAN and Dual USB Combo Connectors

CN Label: **LAN1_USB01** and **LAN2_USB23**

CN Type: RJ-45

CN Location: See **Figure 1-38**

CN Pinouts: See **Table 1-25**

The MMGA is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

Table 1-25: LAN Pinouts

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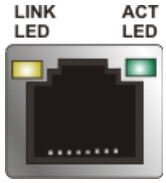

Figure 1-41: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 1-26**.

LINK LED		Activity LED	
Status	**Description**	**Status**	**Description**
Off	Not linked	**Off**	10 Mbps
Yellow	Linked	**Green**	100 Mbps
Blinking	Data activity	**Orange**	1 GbE

Table 1-26: RJ-45 Ethernet Connector LEDs

The MMGA has four external USB 2.0 ports. The ports are integrated into two dual USB and LAN combo connectors. The ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION
1	VCC
2	DATA-
4	DATA+
4	GROUND

Table 1-27: USB Port Pinouts

4.3.4 Parallel Port, Serial Port and VGA Combo Connector

CN Label: **3IN1_DSUB1**

CN Type: DB-25, DB-9 and DB-15

CN Location: See **Figure 1-38**

CN Pinouts: See **Table 1-28, Table 1-29** and **Table 1-30**

A 25-pin parallel port connector, a male DB-9 serial port (COM1) and a female DB-15 VGA connector are integrated into a single EPIC connector as shown in **Figure 1-38**.

The MMGA includes one on-board parallel port accessed through one 25-pin D-type female connector. The parallel port is usually connected to a printer. The connector is show in **Figure 1-42** and the pinouts are shown in **Table 1-28**.

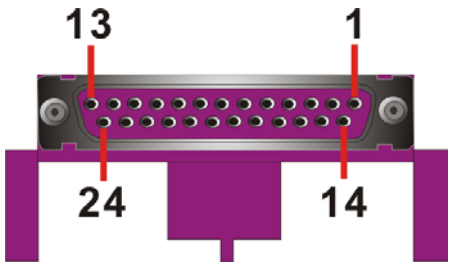

Figure 1-42 Parallel Port Connector Pinout Locations

PIN	Description	PIN	Description
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE

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17	PRINTER SELECT LN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND		

Table 1-28: Parallel Port Connector Pinouts

The male DB-9 COM 1 serial port connector is connected to RS-232 serial communications devices. The connector is show in **Figure 1-43** and the pinouts are shown in **Table 1-29**.

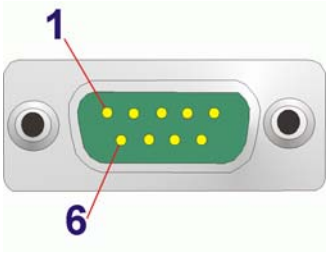

Figure 1-43: COM1 Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI
5	GND		

Table 1-29: RS-232 Serial Port (COM 1) Pinouts

The female DB-15 VGA connector connects to standard VGA displays. The connector is show in **Figure 1-44** and the pinouts are shown in **Table 1-30**.

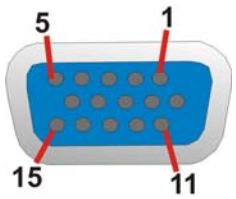

Figure 1-44: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC / NC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 1-30: VGA Connector Pinouts

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Chapter

5

Installation

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5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the MMGA may result in permanent damage to the MMGA and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the MMGA. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the MMGA, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***: Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the MMGA, place it on an antic-static pad. This reduces the possibility of ESD damaging the MMGA.
- ***Only handle the edges of the PCB***: When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the MMGA is installed. All installation notices pertaining to the installation of the MMGA should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the MMGA and injury to the person installing the motherboard.

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the MMGA, MMGA components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the MMGA installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the MMGA on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the MMGA off:

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- When working with the MMGA, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the MMGA **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the MMGA is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The jumpers have been properly configured
- The MMGA is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - SATA drives
  - Power supply
  - USB cable
  - Serial port cable
- The following external peripheral devices are properly connected to the chassis:
  - Keyboard/Mouse
  - VGA screen
  - USB devices
  - LAN

5.3 Unpacking

5.3.1 Unpacking Precautions

When the MMGA is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 5.1**.
- Make sure the packing box is facing upwards so the MMGA does not fall out of the box.
- Make sure all the components in the checklist shown in **Chapter 3** are present.

NOTE:

If some of the components listed in the checklist in **Chapter 3** are missing, please do not proceed with the installation. If any of the components listed in the checklist below are missing, contact CyberResearch, Inc.

5.4 CPU, CPU Cooling Kit and DIMM Installation

WARNING:

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU, MMGA and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the MMGA. If one of these components is not installed the MMGA cannot run.

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5.4.1 Socket LGA775 CPU Installation

NOTE:

Enabling Hyper-Threading Technology on your system requires meeting all of the platform requirements listed below:

- **CPU**: An Intel® Processor with HT Technology must be installed
- **Chipset**: An Intel® Chipset that supports HT Technology (that has been met by the MMGA)
- **OS**: An operating system that has optimizations for HT Technology

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

The LGA775 socket is shown in **Figure 1-45**.

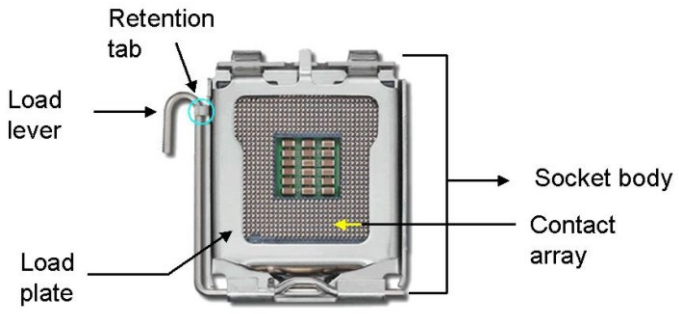

Figure 1-45: Intel® LGA775 Socket

To install a socket LGA775 CPU onto the MMGA, follow the steps below:

WARNING:

When handling the CPU, only hold it on the sides. DO NOT touch the pins at the bottom of the CPU.

Step 1: **Remove the protective cover.** Remove the black protective cover by prying it off the load plate. To remove the protective cover, locate the "**REMOVE**" sign and use your fingernail to pry the protective cover off. See **Figure 1-46**.

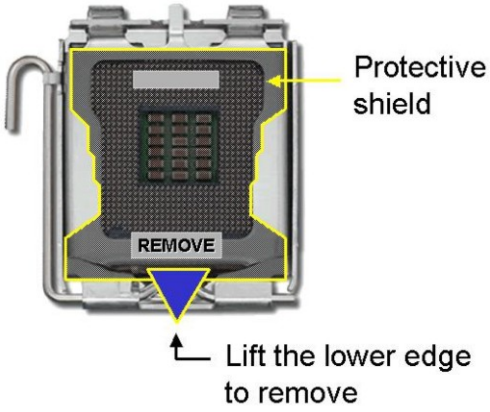

Figure 1-46: Remove the CPU Socket Protective Shield

Step 2: **Open the socket**. Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Rotate the load lever to a fully open position. Then rotate the load plate towards the opposite direction.

See **Figure 1-47**.

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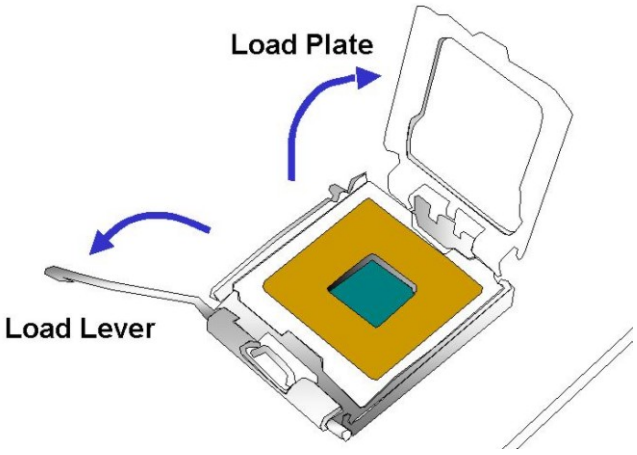

Figure 1-47: Open the CPU Socket Load Plate

Step 3: **Inspect the CPU socket** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 4: **Orientate the CPU properly**. Make sure the IHS (Integrated Heat Sink) side is facing upward.

Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly.
See **Figure 1-48**.

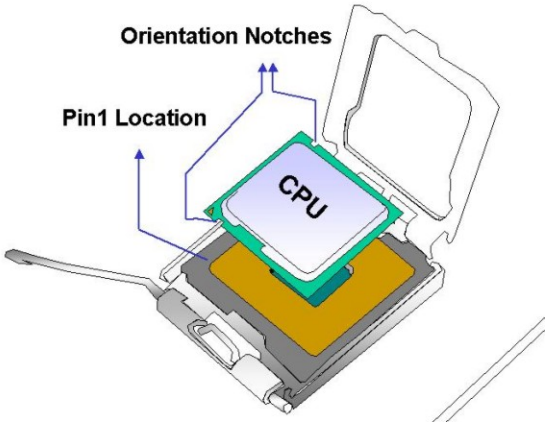

Figure 1-48: Insert the Socket LGA775 CPU

Step 8: **Close the CPU socket.** Close the load plate and engage the load lever by pushing it back to its original position. Secure the load lever under the retention tab on the side of CPU socket.

Step 9: **Connect the CPU 12V cable to the 12V power.** After the cooling kit is installed connect the CPU cable to the CPU 12V power connector.

5.4.2 Socket LGA775 Cooling Kit Installation

WARNING:

It is strongly recommended that you DO NOT use the original heat sink and cooler provided by Intel® on the MMGA.

The cooling kit includes a support bracket that is combined with the heat sink mounted on the CPU to counterweigh and balance the load on both sides of the PCB.

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Figure 1-49: Cooling Kit

The Socket LGA775 CPU cooling kit shown in **Figure 1-49** can be purchased separately. The cooling kit comprises a CPU heat sink and a cooling fan.

WARNING:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, follow the instructions below.

Step 1: **Place the cooling kit onto the socket LGA775 CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure the four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Mount the cooling kit**. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the predrilled holes on the bottom of the PCB.

Step 4: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB

holes. (See **Figure 1-50**)

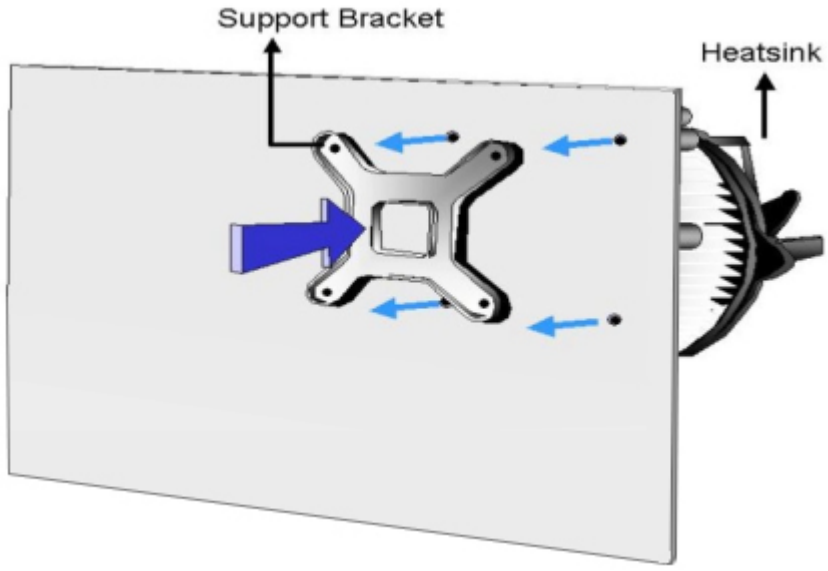

Figure 1-50: Securing the Heat sink to the PCB Board

Step 5: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 6: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the MMGA. Carefully route the cable and avoid heat generating chips and fan blades.

5.4.3 DIMM Installation

WARNING:

Using incorrectly specified DIMM may cause permanently damage the MMGA. Please make sure the purchased DIMM complies with the memory specifications of the MMGA. DIMM specifications compliant with the MMGA are listed in **Chapter 2**.

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5.4.3.1 DIMM Purchasing Guidelines

WARNING:

Only use DDR2 DIMMs. If DDR DIMMs are used the system may be irreparably damaged.

When purchasing the DDR2 DIMM, please follow the guidelines below:

- ONLY purchase DDR2 DIMM
- Have a frequency of 667 MHz or 800 MHz
- Have a maximum capacity of 2.0 GB
- If more than one DDR2 DIMM is being installed in the system, please purchase DIMM that have the same capacity and operating frequency.

5.4.3.2 DIMM Installation Order

There are two 64-bit wide DDR2 channels on the Intel® Q35 Northbridge, Channel A and Channel B. DDR2 Channel A and DDR2 Channel B are shown in **Figure 1-51** below.

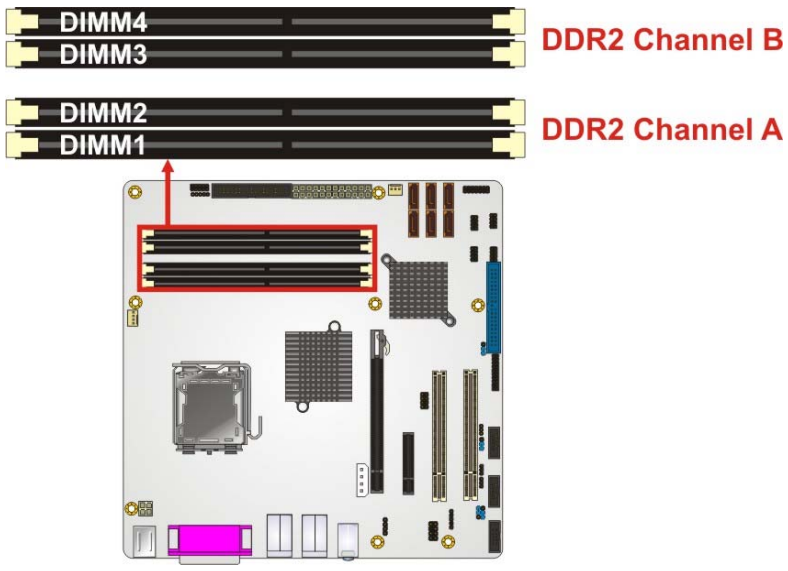

Figure 1-51: DDR2 Channels

On the MMGA, each channel is interfaced to two 240-pin DIMM sockets in the following order (see **Figure 1-51** above):

- **Channel A**: DIMM1 and DIMM2
- **Channel B**: DIMM3 and DIMM4

When populating the DDR2 DIMM sockets, populate them in the following order to optimize the memory performance:

Step 1: **DIMM1**. Install the first DDR2 DIMM into the DIMM1 DDR2 DIMM socket.

Step 2: **DIMM3**. Install the second DDR2 DIMM into the DIMM3 DDR2 DIMM socket.

Step 3: **DIMM2**. Install the third DDR2 DIMM into the DIMM2 DDR2 DIMM socket.

Step 4: **DIMM4**. Install the fourth DDR2 DIMM into the DIMM4 DDR2 DIMM socket.

5.4.3.3 DIMM Installation Guidelines

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 1-52**.

Step 1: **Open the DIMM socket handles**. The DIMM socket has two handles that secure the DIMM into the socket. Before the DIMM can be inserted into the socket, the handles must be opened. See **Figure 1-52**.

Step 2: **Align the DIMM with the socket**. The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 1-52**.

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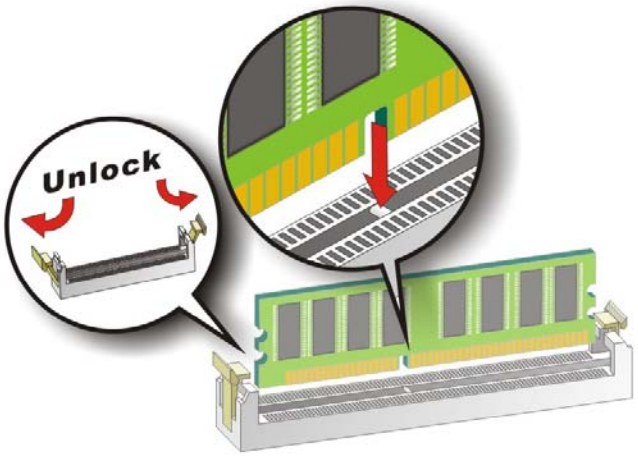


Figure 1-52: Installing a DIMM

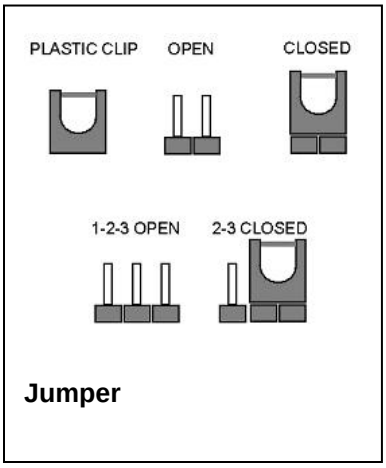
Step 3: **Insert the DIMM**. Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 1-52**.

Step 4: **Removing a DIMM**. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

5.5 Jumper Settings

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



Jumper

Before the MMGA is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the MMGA are listed in **Table 1-31**.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header
COM2 pin 9 setting	J_COM_F2	3-pin header
COM3 pin 9 setting	J_COM_F3	3-pin header
COM4 pin 9 setting	J_COM_F4	3-pin header
COM2 pin 9 voltage setting	J_COM_V2	3-pin header
COM3 pin 9 voltage setting	J_COM_V3	3-pin header
COM4 pin 9 voltage setting	J_COM_V4	3-pin header

Table 1-31: Jumpers

5.5.1 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 1-32**

Jumper Location: See **Figure 1-53**

If the MMGA fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults

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- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu. The clear CMOS jumper settings are shown in **Table 1-32**.

Clear CMOS	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 1-32: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 1-53** below.

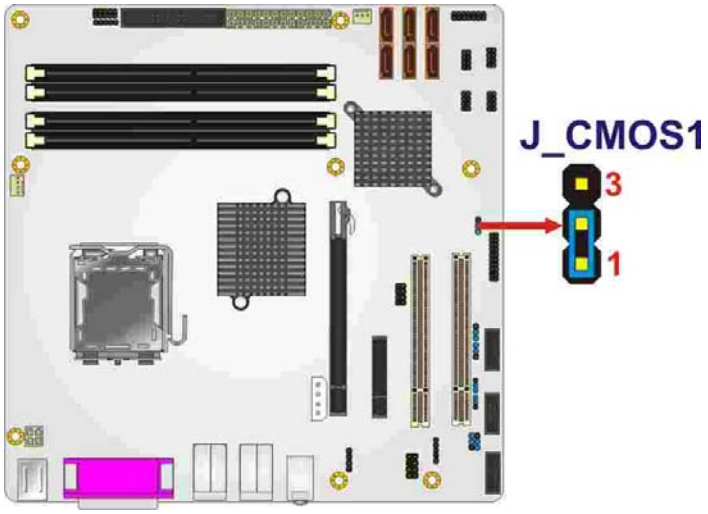

Figure 1-53: Clear CMOS Jumper

5.5.2 COM Port Pin 9 Setting Jumpers

Jumper Label: **J_COM_F2**, **J_COM_F3** and **J_COM_F4**

Jumper Type: 3-pin header

Jumper Settings: See **Table 1-33**

Jumper Location: See **Figure 1-54**

The COM Port Pin 9 Setting jumpers configure pin 9 on COM 2/COM 3/COM 4 as either a +5V, +12V power source (see **Section 5.5.3** to setup) or as a ring-in (RI) line. The COM Port Pin 9 Setting jumpers selection options are shown in **Table 1-33**.

J_COM_F2	Description	
Short 1 – 2	COM 2 RI Pin use voltage	
Short 2 – 3	COM 2 RI Pin use RI	Default
J_COM_F3	Description	
Short 1 – 2	COM 3 RI Pin use voltage	
Short 2 – 3	COM 3 RI Pin use RI	Default
J_COM_F4	Description	
Short 1 – 2	COM 4 RI Pin use voltage	
Short 2 – 3	COM 4 RI Pin use RI	Default

Table 1-33: COM Port Pin 9 Setting Jumper Settings

The COM Port Pin 9 Setting jumper locations are shown in **Figure 1-54** below.

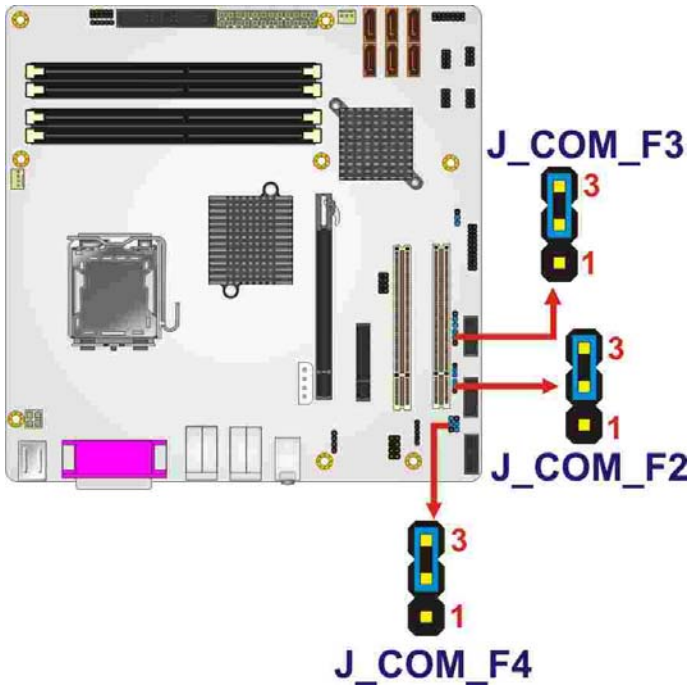

Figure 1-54: COM Port Pin 9 Setting Jumper Locations

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5.5.3 COM Port Pin 9 Voltage Setting Jumpers

Jumper Label: **J_COM_V2**, **J_COM_V3** and **J_COM_V4**

Jumper Type: 3-pin header

Jumper Settings: See **Table 1-33**

Jumper Location: See **Figure 1-54**

The COM Port Pin 9 Voltage Setting jumpers configure pin 9 on COM 2/COM 3/COM 4 as either a +5V or +12V power source. The COM Port Pin 9 Voltage Setting jumpers selection options are shown in **Table 1-33**.

J_COM_V2	Description	
Short 1 – 2	COM 2 RI Pin use +5V	Default
Short 2 – 3	COM 2 RI Pin use +12V	
J_COM_V3	Description	
Short 1 – 2	COM 3 RI Pin use +5V	Default
Short 2 – 3	COM 3 RI Pin use +12V	
J_COM_V4	Description	
Short 1 – 2	COM 4 RI Pin use +5V	Default
Short 2 – 3	COM 4 RI Pin use +12V	

Table 1-34: COM Port Pin 9 Voltage Setting Jumper Settings

The COM Port Pin 9 Voltage Setting jumper locations are shown in **Figure 1-54** below.

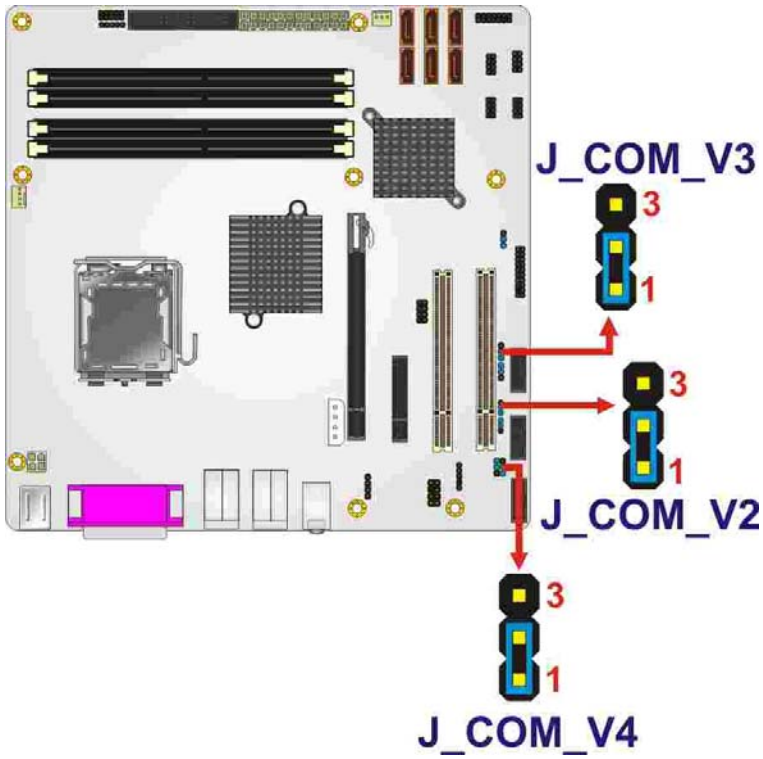

Figure 1-55: COM Port Pin 9 Voltage Setting Jumper Locations

5.6 Chassis Installation

5.6.1 Airflow

WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the MMGA must have air vents to allow cool air to move into the system and hot air to move out.

The MMGA must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

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5.6.2 Motherboard Installation

To install the MMGA motherboard into the chassis please refer to the reference material that came with the chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in **Table 1-35** are shipped with the MMGA.

Quantity	Type
1	Dual RS-232 cable
6	SATA drive cables
3	SATA drive power cables
1	USB cable

Table 1-35: Provided Cables

5.7.2 Dual RS-232 Cable Connection

The dual RS-232 cable consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the dual RS-232 cable, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connectors**. Insert one connector into each serial port box headers. See **Figure 1-56**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

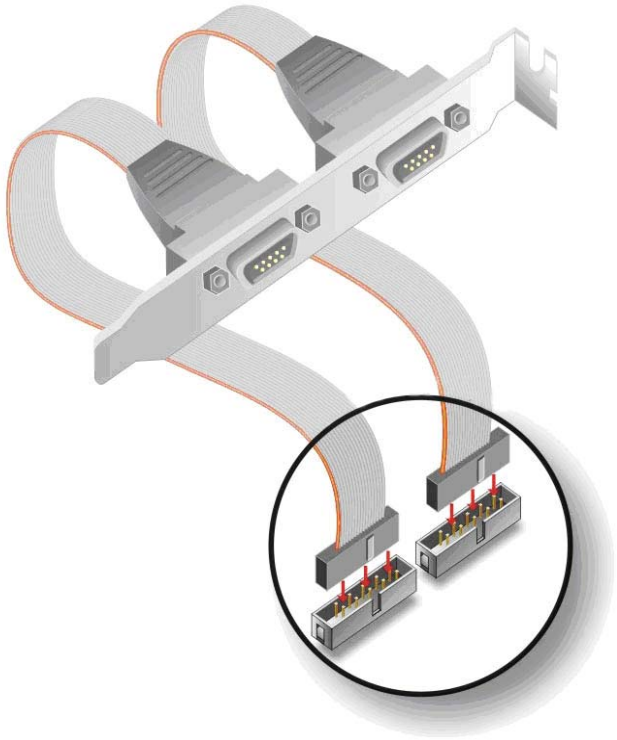

Figure 1-56: Dual RS-232 Cable Installation

Step 3: **Secure the bracket**. The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis

5.7.3 SATA Drive Connection

The MMGA is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 1-57**.

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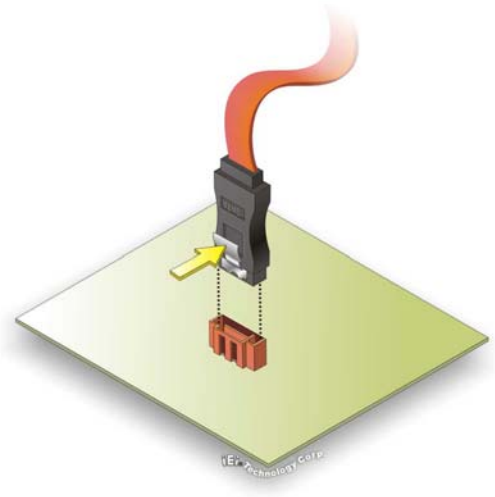

Figure 1-57: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 1-58**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 1-58**.

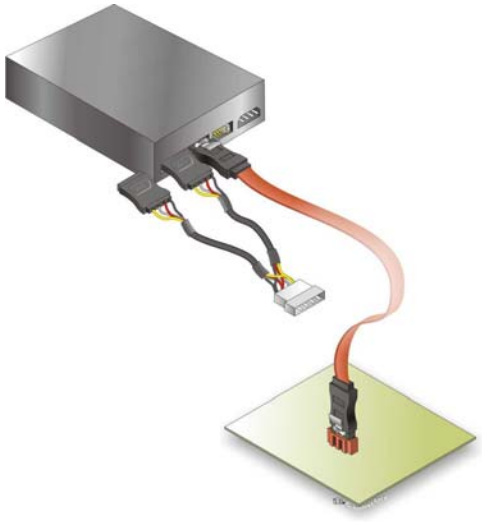

Figure 1-58: SATA Power Drive Connection

5.7.4 USB Cable (Dual Port)

The MMGA is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the USB connectors are shown in **Chapter 3**.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the MMGA USB connector.

Step 3: **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the MMGA, connect the cable connectors to the onboard connectors. See **Figure 1-59**.

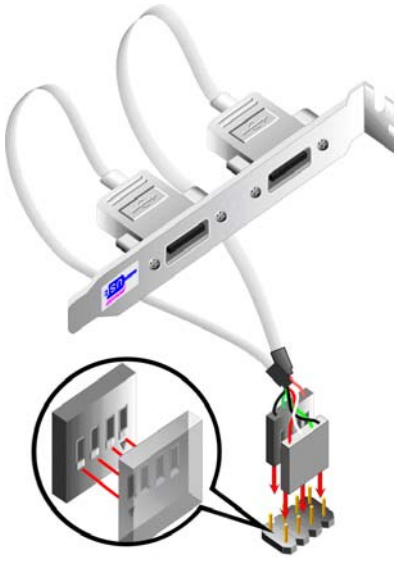

Figure 1-59: Dual USB Cable Connection

Step 4: **Attach the bracket to the chassis**. The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation

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instructions that came with the chassis.

5.7.5 PCIe x16 Expansion Card Installation

A PCIe x16 expansion card can be installed on the MMGA using the PCIe x16 expansion slot. To install a PCIe expansion card into the PCIe socket, please follow the steps below and refer to **Figure 1-60**.

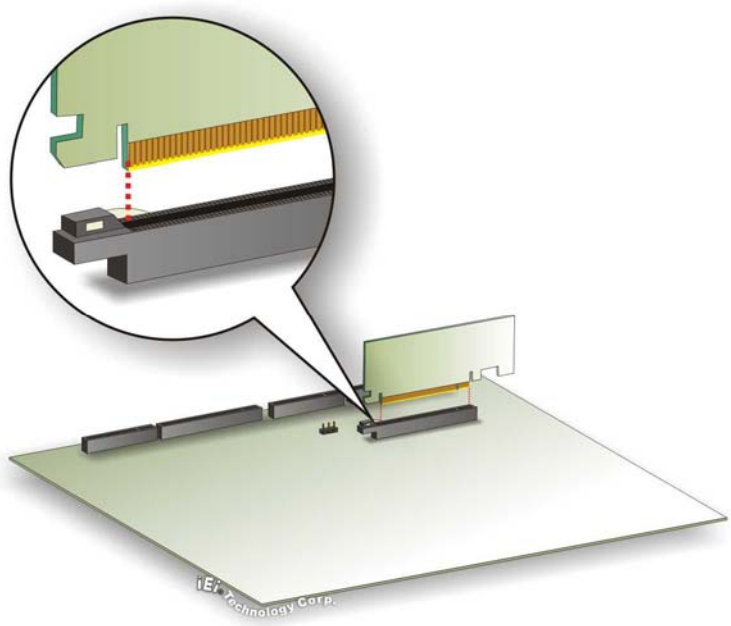

Figure 1-60: PCIe x16 Installation

Step 1: **Locate the PCIe x16 socket**. Place the MMGA on an anti-static pad with the solder side facing up.

Step 2: **Align the PCIe x16 card with the socket**. The PCIe x16 card must be aligned so the notch on the PCIe x16 card aligns with the plastic bridge in the socket.

Step 3: **Insert the PCIe x16 card**. Push the PCIe x16 card into the socket, perpendicular to the MMGA.

Step 4: **Secure the PCI x16 card**. Push the PCIe x16 card down until the clip engages, securing the card in place.

5.8 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- Audio devices
- RJ-45 Ethernet cable connectors
- Parallel port device
- Keyboard/mouse
- Serial port devices
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding MMGA external peripheral interface connector making sure the pins are properly aligned.

5.8.1 Audio Connection

Audio signals are interfaced through three phone jack connections. The red phone jack is for Mic In, blue is for Line In and green is for Speaker Out. Follow the steps below to connect audio devices to the MMGA.

Step 1: **Locate the audio phone jacks**. The locations of the audio phone jacks are shown in **Chapter 3**.

Step 2: **Insert audio phone jack plugs**. Insert audio phone jack plugs into the audio phone jacks on the external peripheral interface. See **Figure 1-61**.

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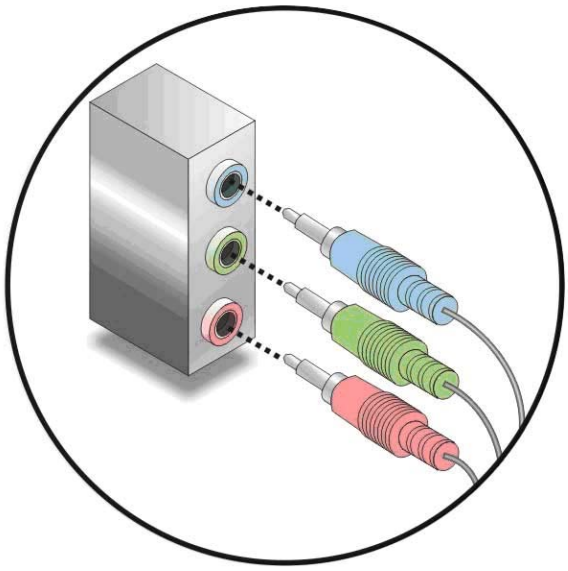

Figure 1-61: Audio Connectors

5.8.2 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the MMGA. See **Figure 1-62**.

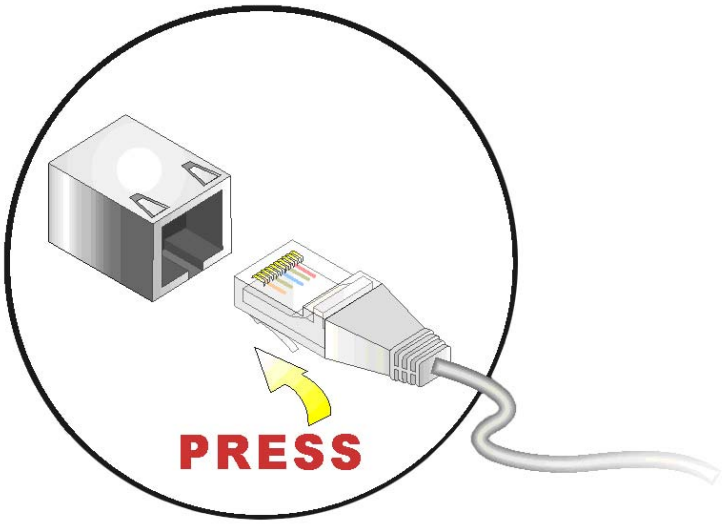

Figure 1-62: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

5.8.3 Parallel Device Connection

The MMGA has a single female DB-25 connector on the external peripheral interface panel for parallel devices. Follow the steps below to connect a parallel device to the MMGA.

Step 1: **Locate the DB-25 connector**. The location of the DB-25 connector is shown in **Chapter 3**.

Step 2: **Insert the DB-25 connector**. Insert the DB-25 connector of a parallel device into the DB-25 connector on the external peripheral interface. See **Figure 1-63**.

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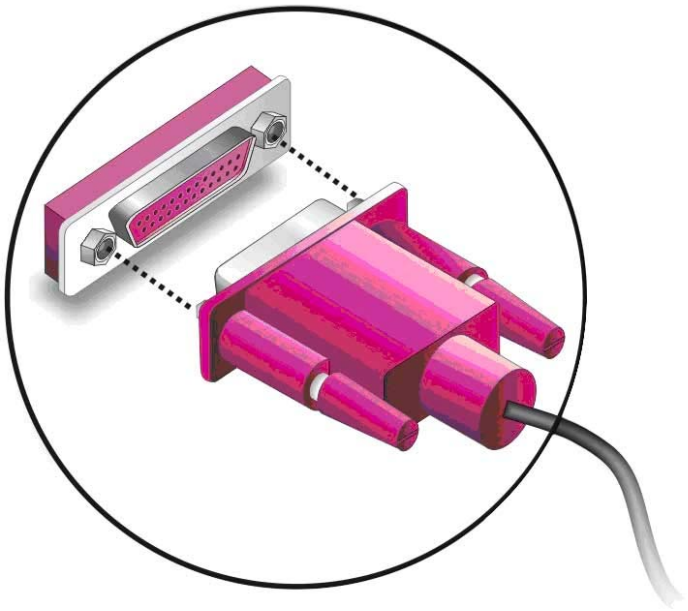

Figure 1-63: Parallel Device Connector

Step 3: **Secure the connector**. Secure the DB-25 connector to the external interface by tightening the two retention screws on either side of the connector.

5.8.4 PS/2 Keyboard and Mouse Connection

The MMGA has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the MMGA.

Step 1: **Locate the dual PS/2 connector**. The location of the dual PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See **Figure 1-64**.

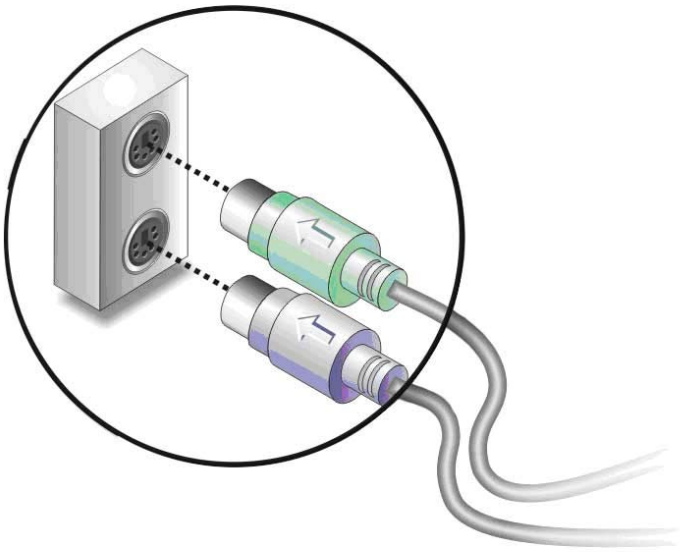

Figure 1-64: PS/2 Keyboard/Mouse Connector

5.8.5 Serial Device Connection

The MMGA has a single male DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the MMGA.

Step 1: **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 3**.

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 1-65**.

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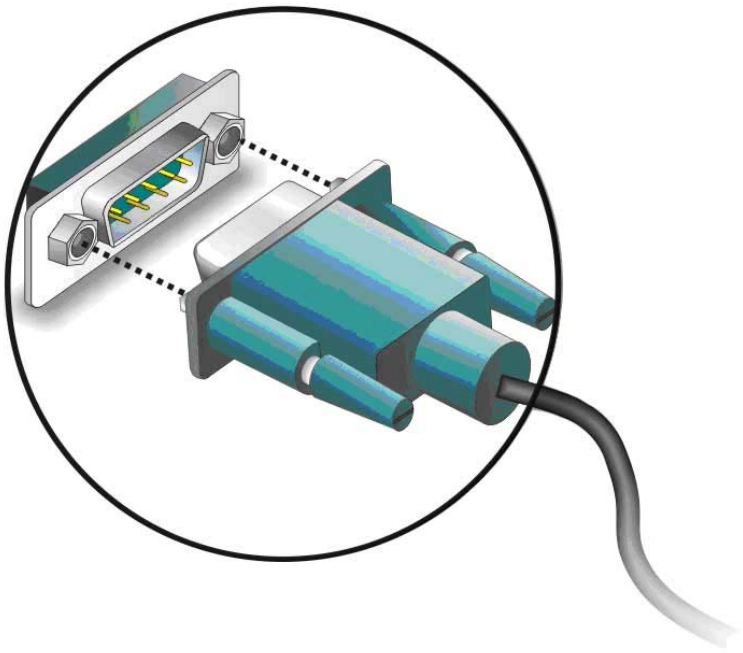

Figure 1-65: Serial Device Connector

Step 3: **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

5.8.6 USB Device Connection

There are two external USB 2.0 connectors. Both connectors are perpendicular to the MMGA. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

Step 1: **Located the USB connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the USB device connector with one of the connectors on the MMGA. See **Figure 1-66**.

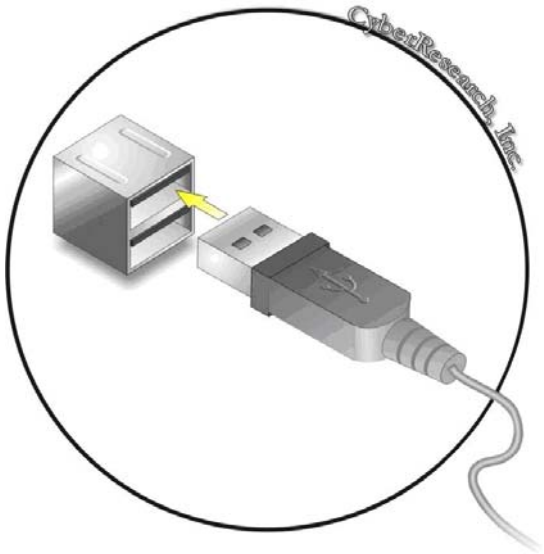

Figure 1-66: USB Device Connection

Step 3: **Insert the device connector.** Once aligned, gently insert the USB device connector into the onboard connector.

5.8.7 VGA Monitor Connection

The MMGA has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the MMGA, please follow the instructions below.

Step 1: **Locate the female DB-15 connector**. The location of the female DB-15 connector is shown in **Chapter 3**.

Step 2: **Align the VGA connector**. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the MMGA. See **Figure 1-67**.

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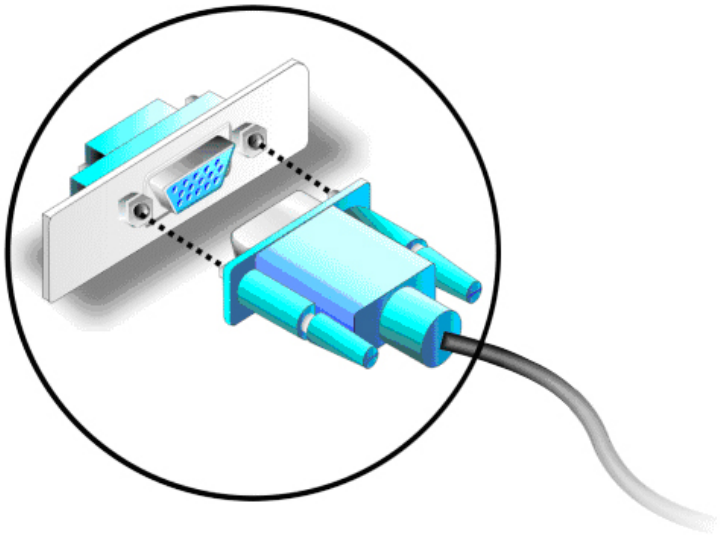

Figure 1-67: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

Chapter

6

AMI BIOS

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6.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

6.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes

F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 5.5.1**.

6.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

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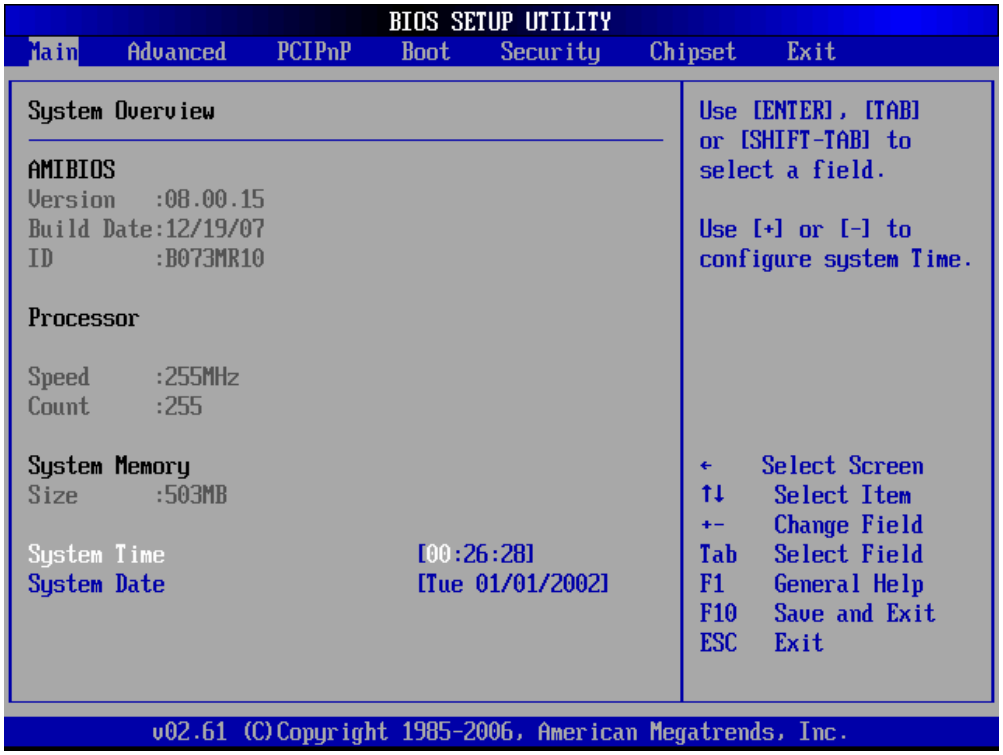
6.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- AMI BIOS: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID
- Processor: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor
  - **Speed**: Lists the processor speed

- **Count**: The number of CPUs on the motherboard

- System Memory: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The System Overview field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

6.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING!

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- CPU Configuration (see **Section 6.3.1**)
- IDE Configuration (see **Section 6.3.2**)
- Floppy Configuration (see **Section 6.3.3**)
- Super IO Configuration (see **Section 6.3.4**)
- Hardware Health Configuration (see **Section 6.3.5**)
- ACPI Configuration (see **Section 6.3.6**)
- AHCI Configuration (see **Section 6.3.7**)
- Intel AMT Configuration (see **Section 6.3.8**)
- Remote Access Configuration (see **Section 6.3.9**)

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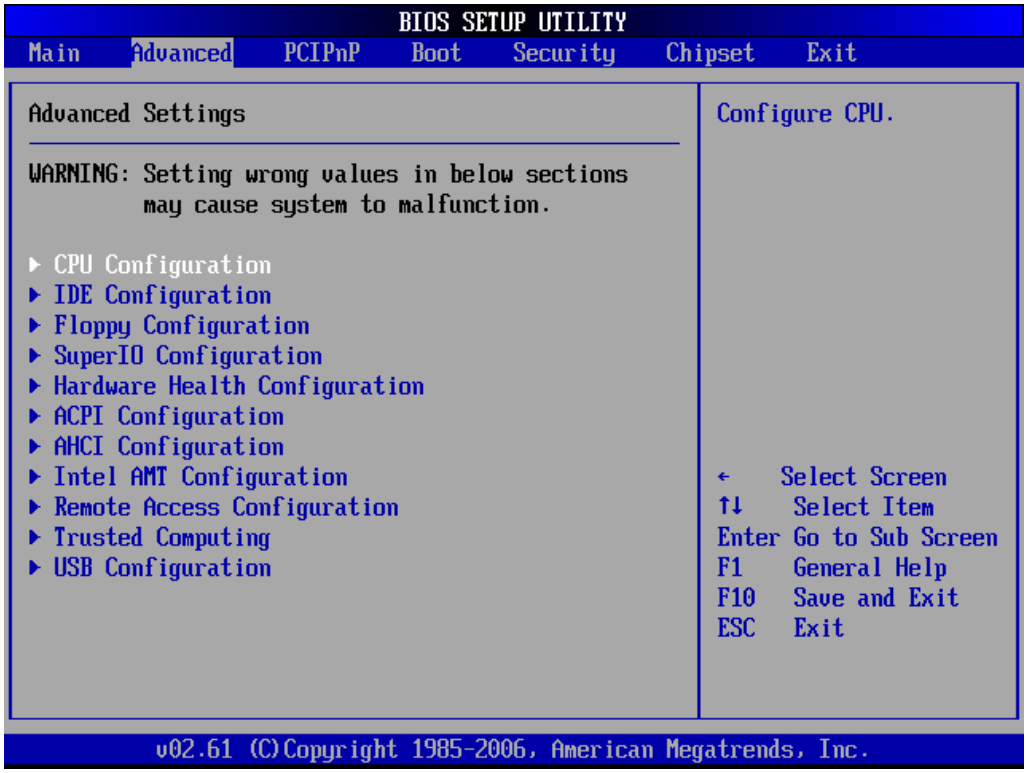
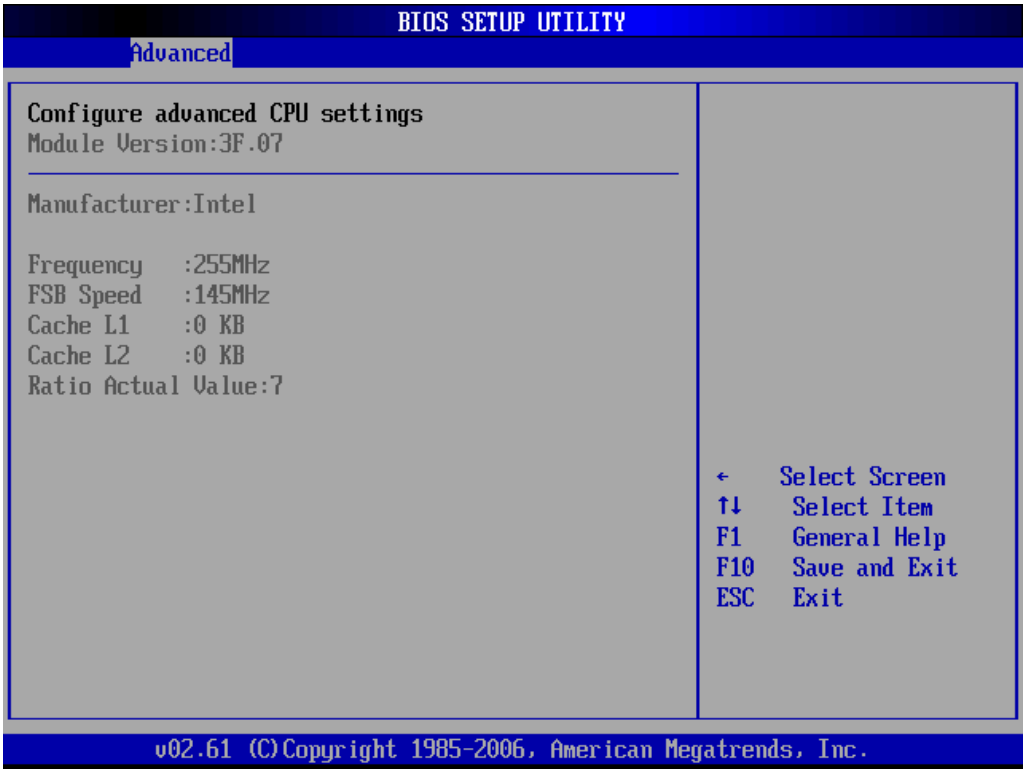
- Trusted Computing (see **Section 6.3.10**)
- USB Configuration (see **Section 6.3.11**)



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 3: CPU Configuration

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- Manufacturer: Lists the name of the CPU manufacturer
- Brand String: Lists the brand name of the CPU being used
- Frequency: Lists the CPU processing speed
- FSB Speed: Lists the FSB speed
- Cache L1: Lists the CPU L1 cache size
- Cache L2: Lists the CPU L2 cache size

6.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.

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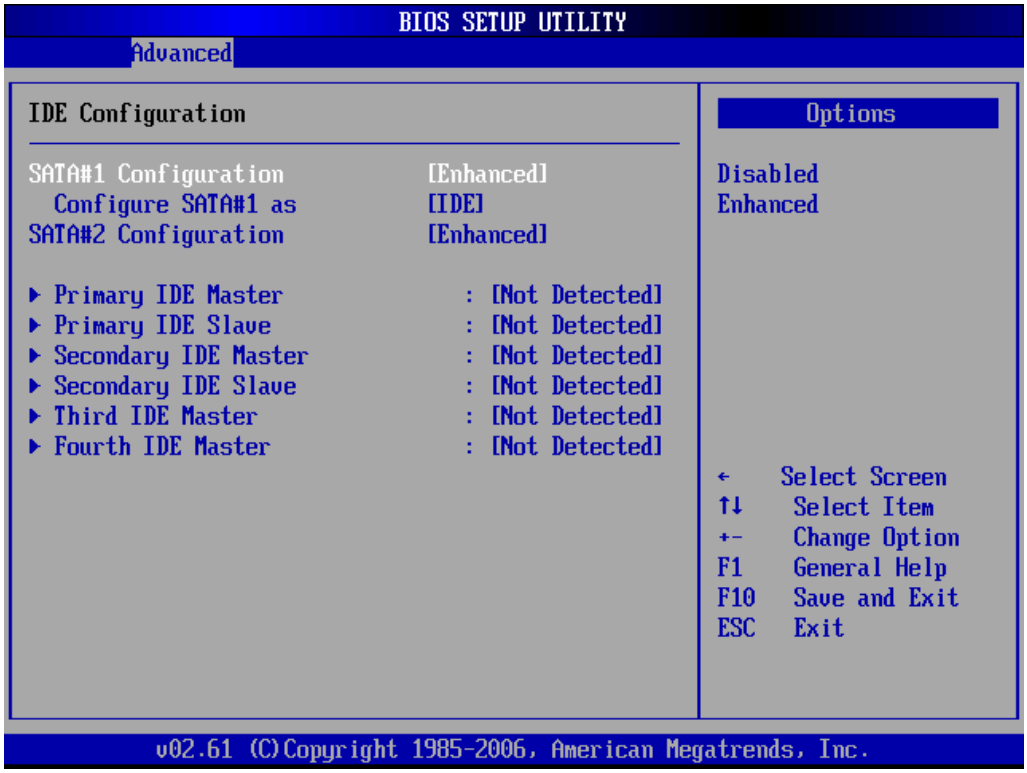

BIOS Menu 4: IDE Configuration

➔ SATA#1 Configuration [Enhanced]

Use the **SATA#n** BIOS option to enable the nth SATA drive port.

- ➔ **Disabled** The nth SATA drive port is disabled
- ➔ **Enhanced** **DEFAULT** The nth SATA drive port is activated

➔ Configure SATA as [IDE]

Use the **Configure SATA as** option to configure SATA devices as normal IDE devices.

- ➔ **IDE** **DEFAULT** Configures SATA devices as normal IDE device.
- ➔ **RAID** Configures SATA devices as RAID device.
- ➔ **AHCI** Configures SATA devices as AHCI device.

➔ **IDE Master and IDE Slave**

When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave
- Third IDE Master
- Fourth IDE Master

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 6.3.2.1** appear.

6.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.

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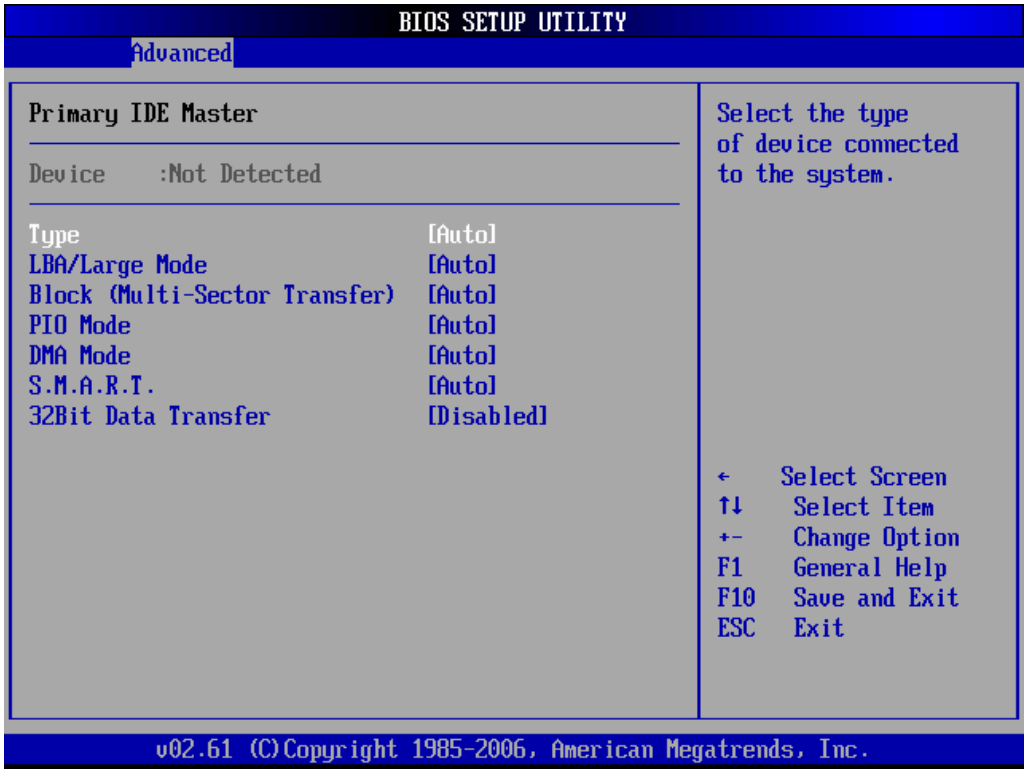

BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ Auto-Detected Drive Parameters

The "grayed-out" items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- Device: Lists the device type (e.g. hard disk, CD-ROM etc.)
- Type: Indicates the type of devices a user can manually select
- Vendor: Lists the device manufacturer
- Size: List the storage capacity of the device.
- LBA Mode: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- Block Mode: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- PIO Mode: Indicates the PIO mode of the installed device.

- Async DMA: Indicates the highest Asynchronous DMA Mode that is supported.
- Ultra DMA: Indicates the highest Synchronous DMA Mode that is supported.
- S.M.A.R.T.: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- 32Bit Data Transfer: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed** BIOS is prevented from searching for an IDE disk drive on the specified channel.

➔ **Auto** **DEFAULT** The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.

➔ **CD/DVD** The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

➔ **ARMD** This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

➔ **ZIP**

➔ **LS-120**

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➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled** BIOS is prevented from using the LBA mode control on the specified channel.

➔ **Auto** **DEFAULT** BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

➔ **Disabled** BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.

➔ **Auto** **DEFAULT** BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto** **DEFAULT** BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

- ➔ **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps
- ➔ **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps
- ➔ **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps
- ➔ **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps
- ➔ **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps

  (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

- ➔ **Auto** **DEFAULT** BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
- ➔ **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps
- ➔ **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
- ➔ **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
- ➔ **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- ➔ **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
- ➔ **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps

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➔ **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps

➔ **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps

➔ **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps

➔ **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

➔ **Auto** **DEFAULT** BIOS auto detects HDD SMART support.

➔ **Disabled** Prevents BIOS from using the HDD SMART feature.

➔ **Enabled** Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

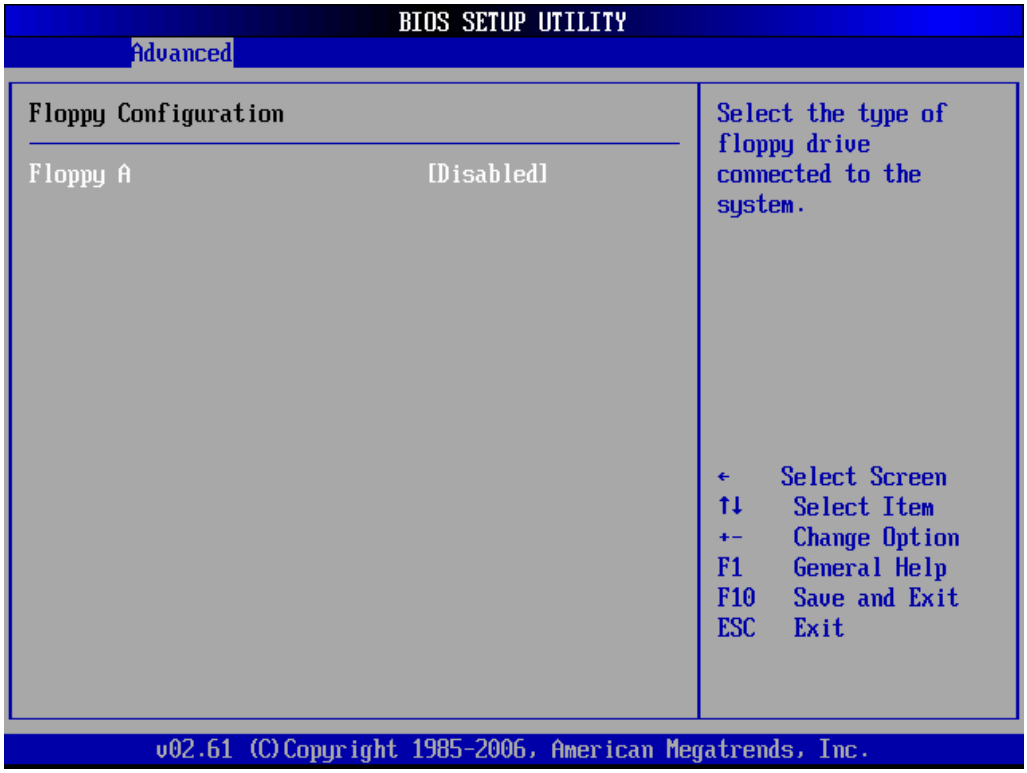
Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

6.3.3 Floppy Configuration

Use the **Floppy Configuration menu** to configure the floppy disk drive connected to the system.



BIOS Menu 6: IDE Master and IDE Slave Configuration

➔ **Floppy A**

Use the **Floppy A** option to configure the floppy disk drive. Options are listed below:

- Disabled
- 360 KB 51/4”
- 1.2 MB 51/4”

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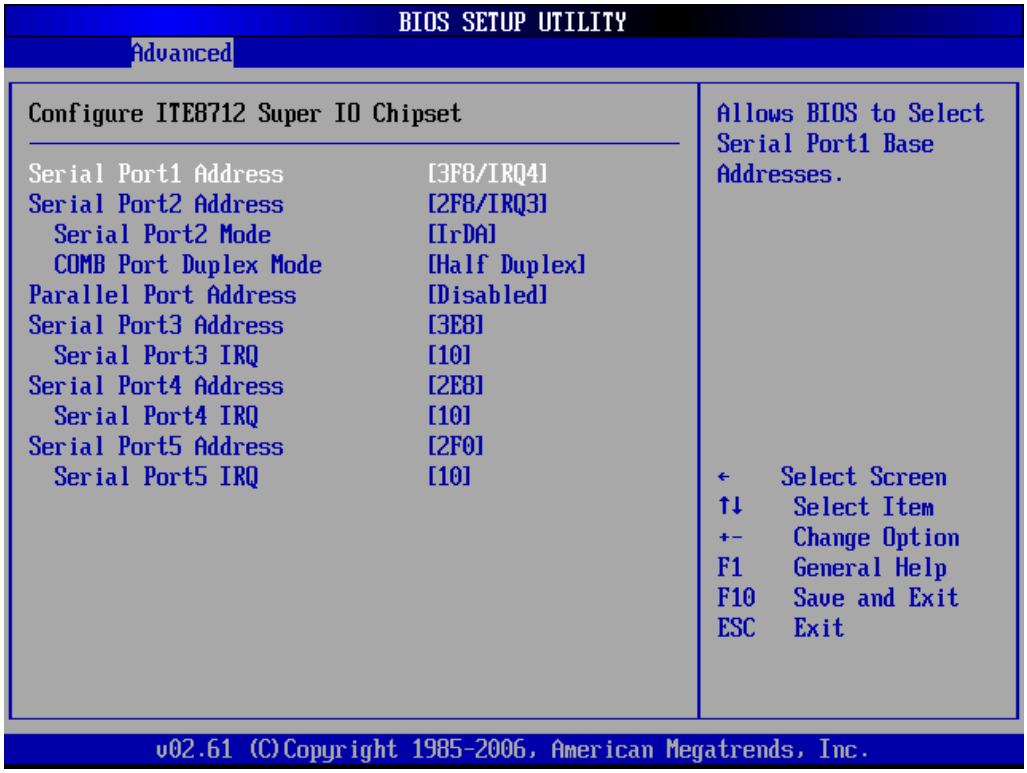
- 720 KB 31/2”
- 1.44 MB 31/2’
- 2.88 MB 31/2”

6.3.4 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.


BIOS SETUP UTILITY
Advanced
Configure ITE8712 Super IO Chipset
Serial Port1 Address [3F8/IRQ4]
Serial Port2 Address [2F8/IRQ3]
Serial Port2 Mode [IrDA]
COMB Port Duplex Mode [Half Duplex]
Parallel Port Address [Disabled]
Serial Port3 Address [3E8]
Serial Port3 IRQ [10]
Serial Port4 Address [2E8]
Serial Port4 IRQ [10]
Serial Port5 Address [2F0]
Serial Port5 IRQ [10]
Allows BIOS to Select Serial Port1 Base Addresses.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.

BIOS Menu 7: Super IO Configuration

➔ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled** No base address is assigned to Serial Port 1

➔ **3F8/IRQ4** **DEFAULT** Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4

➔ **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4

➔ **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3] (For Infrared ONLY)**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled** No base address is assigned to Serial Port 2

➔ **2F8/IRQ3** **DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3

➔ **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4

➔ **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Mode [IrDA]**

Use the **Serial Port2 Mode** option to select the Serial Port2 operational mode.

➔ **IrDA** **DEFAULT** Serial Port 2 mode is IrDA

➔ **ASK IR** Serial Port 2 mode is ASK IR

➔ **COMB Port Duplex Mode [Half Duplex]**

Use the **COMB Port Duplex Mode** option to select the COM port operational mode.

➔ **Half Duplex** **DEFAULT** COM port mode is half-duplex

➔ **Full Duplex** COM port mode is full-duplex

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➔ **Parallel Port Address [Disabled]**

Use the **Parallel Port Address** option to select the parallel port base address.

➔ **Disabled**	**DEFAULT**	No base address is assigned to the Parallel Port
➔ **378**		Parallel Port I/O port address is 378
➔ **278**		Parallel Port I/O port address is 278
➔ **3BC**		Parallel Port I/O port address is 3BC

➔ **Serial Port3 Address [3E8] (For COM2)**

Use the **Serial Port3 Address** option to select the base addresses for serial port 3.

➔ **Disabled**		No base address is assigned to serial port 3
➔ **3E8**	**DEFAULT**	Serial port 3 I/O port address is 3E8
➔ **2E8**		Serial port 3 I/O port address is 2E8
➔ **2E0**		Serial port 3 I/O port address is 2E0

➔ **Serial Port3 IRQ [10]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **4**		Serial port 3 IRQ address is 4
➔ **9**		Serial port 3 IRQ address is 9
➔ **10**	**DEFAULT**	Serial port 3 IRQ address is 10
➔ **11**		Serial port 3 IRQ address is 11

➔ **Serial Port4 Address [2E8] (For COM3)**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

➔ **Disabled** No base address is assigned to serial port 3

➔ **3E8** Serial port 4 I/O port address is 3E8

➔ **2E8** **DEFAULT** Serial port 4 I/O port address is 2E8

➔ **2E0** Serial port 4 I/O port address is 2E0

➔ **Serial Port4 IRQ [10]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

➔ **3** **DEFAULT** Serial port 4 IRQ address is 3

➔ **9** Serial port 4 IRQ address is 9

➔ **10** **DEFAULT** Serial port 4 IRQ address is 10

➔ **11** Serial port 4 IRQ address is 11

➔ **Serial Port5 Address [2F0] (For COM4)**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

➔ **Disabled** No base address is assigned to serial port 5

➔ **3E8** Serial port 5 I/O port address is 3E8

➔ **2E8** Serial port 5 I/O port address is 2E8

➔ **2F0** **DEFAULT** Serial port 5 I/O port address is 2F0

➔ **2D0** Serial port 5 I/O port address is 2D0

➔ **Serial Port5 IRQ [10]**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

➔ **10** **DEFAULT** Serial port 5 IRQ address is 10

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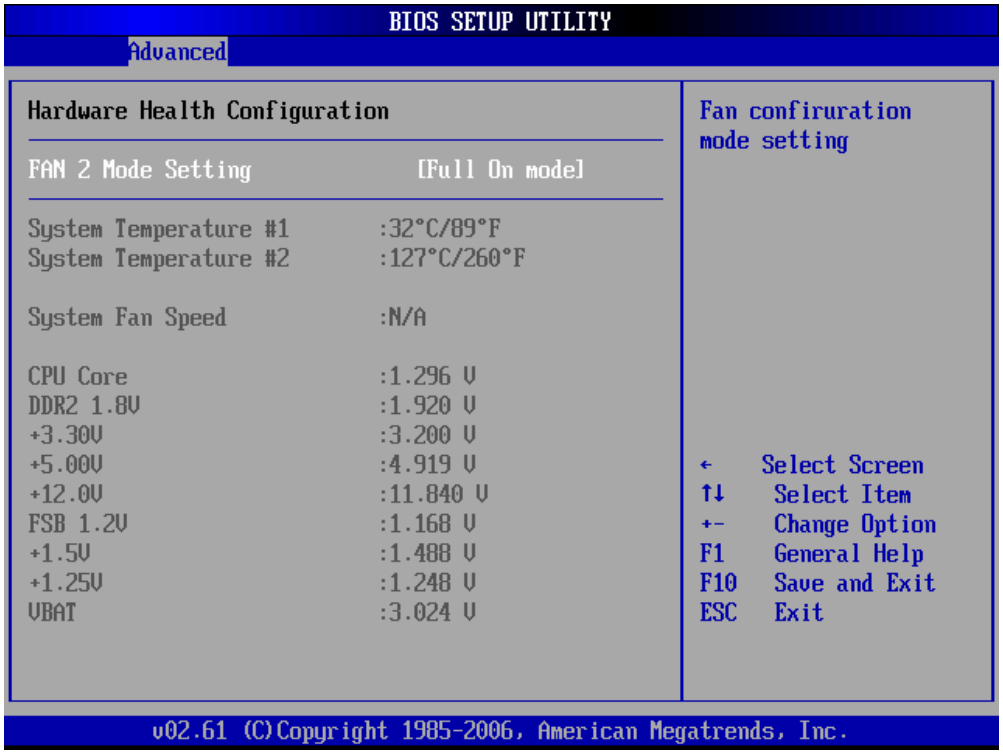
➔ **11** Serial port 5 IRQ address is 11

6.3.5 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 8**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 8: Hardware Health Configuration

➔ **FAN 2 Mode Setting [Full On Mode]**

Use the **FAN 2 Mode Setting** option to configure the second fan.

➔ **Full On Mode** Fan is on all the time

➔ **Automatic mode** **DEFAULT** Fan is off when the temperature is low enough. Parameters must be set by the user.

➔ **PWM Manual mode** Pulse width modulation set manually

The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures: The following system temperatures are monitored
  - System Temperature #1
  - System Temperature #2
- Fan Speeds: The CPU cooling fan speed is monitored.
  - System Fan Speed
- Voltages: The following system voltages are monitored
  - CPU Core
  - DDR2 1.8V
  - +3.3V
  - +5V
  - +12V
  - FSB 1.2V
  - +1.5V
  - +1.25V
  - VBAT

6.3.6 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 9**) configures the Advanced Configuration and Power Interface (ACPI) .

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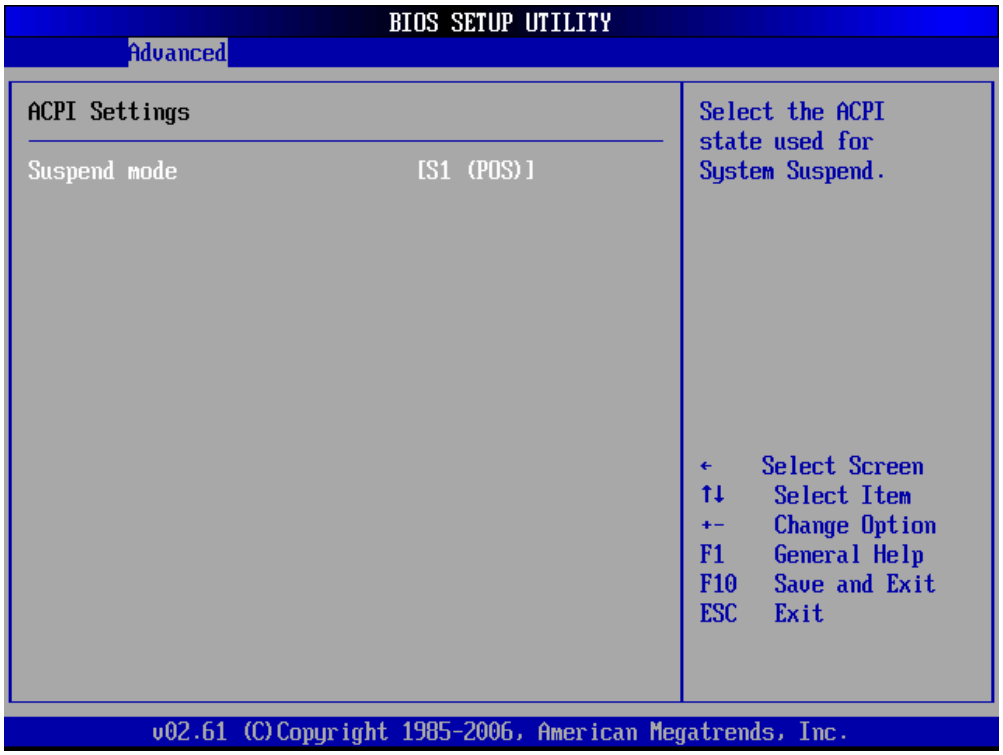


BIOS Menu 9: ACPI Configuration

➔ **Suspend Mode [S1(POS)]**

Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.

➔ **S1 (POS)** **DEFAULT** The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

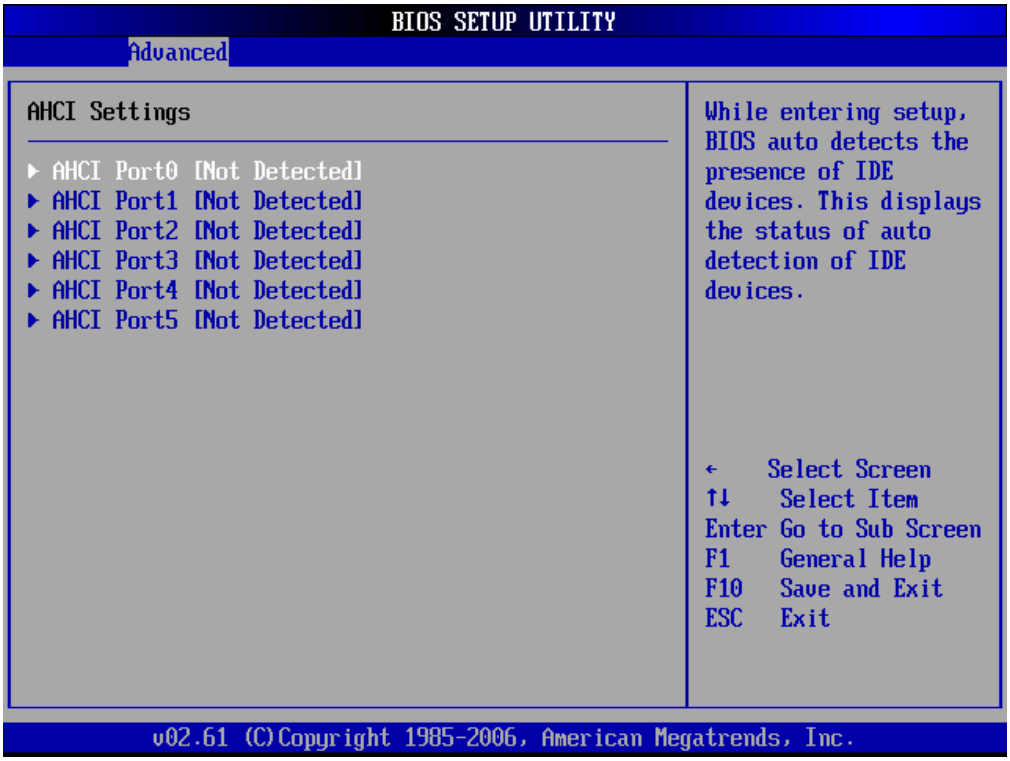
6.3.7 AHCI Configuration

NOTE:

Advanced Host Controller Interface (AHCI) is a new programming interface for SATA host controllers. AHCI systems do not have

master/slave designation for SATA devices, each device is treated as a master, and hardware-assisted native command queuing.

Use the **AHCI Settings** menu (**BIOS Menu 10**) to report on the auto-detection of devices connected to the onboard SATA drive connectors.


BIOS SETUP UTILITY
Advanced
AHCI Settings
AHCI Port0 [Not Detected]
AHCI Port1 [Not Detected]
AHCI Port2 [Not Detected]
AHCI Port3 [Not Detected]
AHCI Port4 [Not Detected]
AHCI Port5 [Not Detected]
While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.

BIOS Menu 10: AHCI Configuration

➔ **AHCI Port n [Not Detected]**

Use the **AHCI Port n** BIOS option to check what AHCI (Advanced Host Controller Interface) devices are detected to a specified SATA drive connector. If a device is detected, selecting the BIOS option, e.g. "**AHCI Port 3**" opens a new window.

6.3.7.1 AHCI Port n

Use the **AHCI Port n** configuration menu (**BIOS Menu 11**) to configure the drive connected to SATA connector n.

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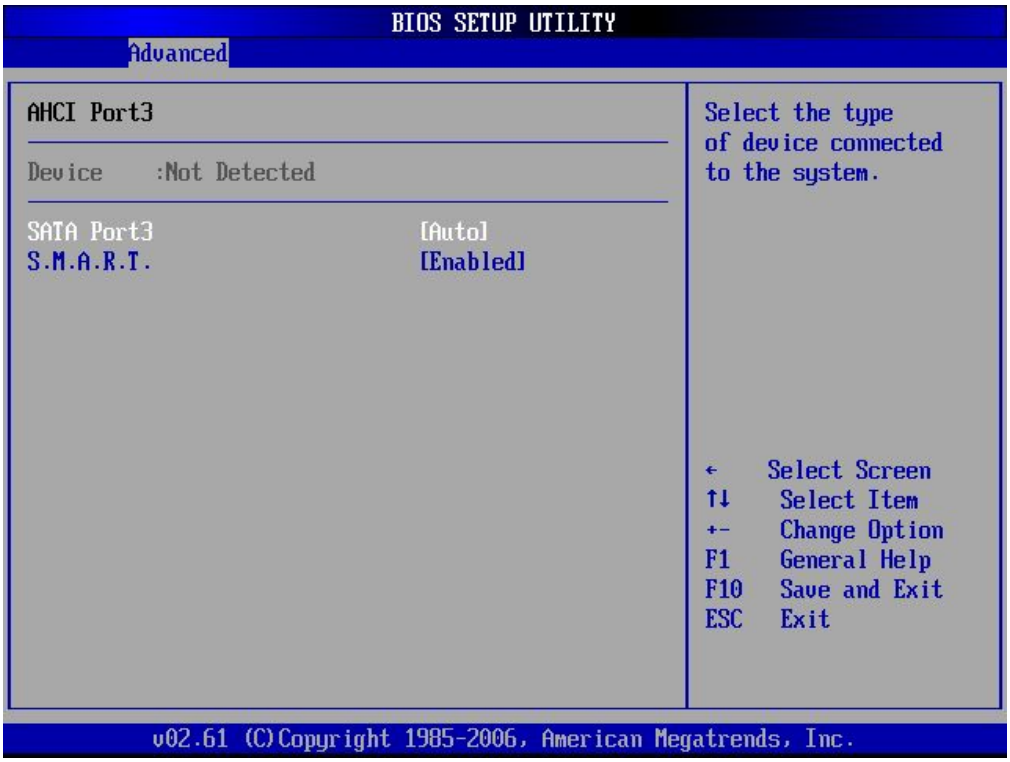


BIOS Menu 11: AHCI Port n Configuration Menu

➔ **SATA Port n [Auto]**

Use the **SATA Port n** option to enable the system to auto-detect the type of drive connected to SATA drive connector n.

➔ **S.M.A.R.T [Enabled]**

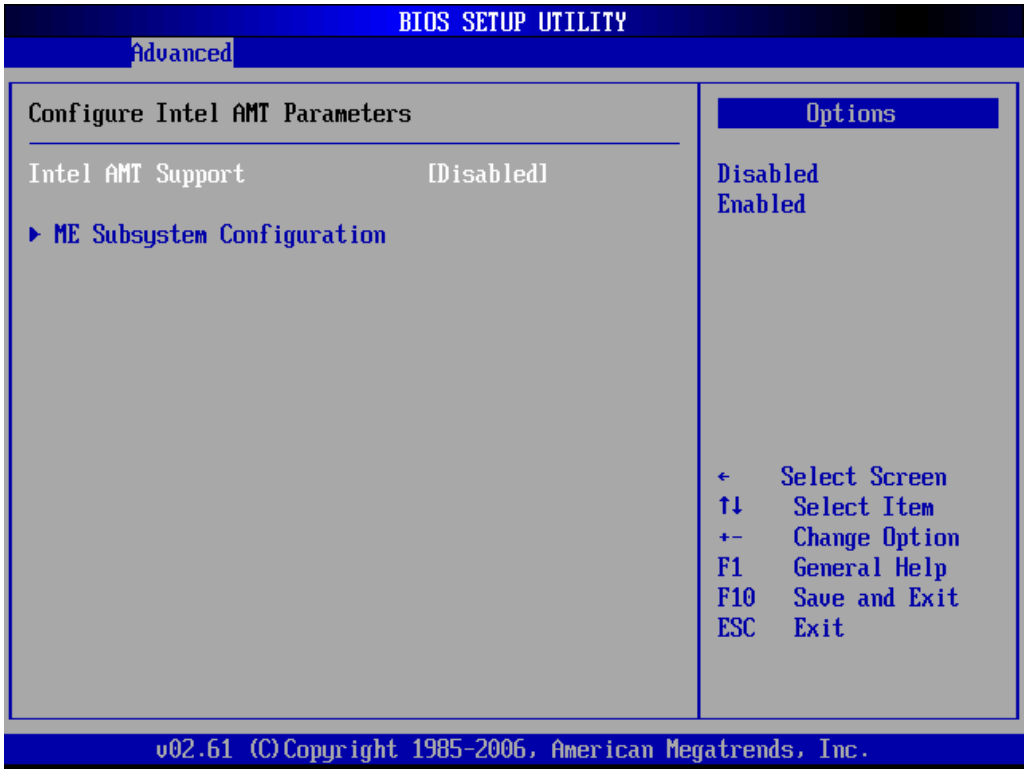
Use the **S.M.A.R.T** option to enable S.M.A.R.T (Self-Monitoring, Analysis, and Reporting Technology) on the drive connected to SATA drive connector n.

➔ **Enabled** **DEFAULT** S.M.A.R.T is enabled on the drive connected to SATA drive connector n on the system

➔ **Disabled** S.M.A.R.T is disabled on the drive connected to SATA drive connector n on the system

6.3.8 Intel AMT Configuration

The **Intel AMT Configuration** menu (**BIOS Menu 12**) configures the Intel® Active Management Technology (AMT) options.



BIOS Menu 12: Intel AMT Configuration

➔ **Intel AMT Support [Enable]**

Use the **Intel AMT Support** option to enable or disable the Intel AMT support.

➔ **Disabled** The Intel® AMT function is disabled.

➔ **Enabled** **DEFAULT** The Intel® AMT function is enabled.

6.3.8.1 ME Subsystem Configuration

The **ME Subsystem Configuration** menu (**BIOS Menu 13**) allows the AMT subsystem (Management Engine, ME) and Host Embedded Controller Interface (HECI) driver options to be configured.

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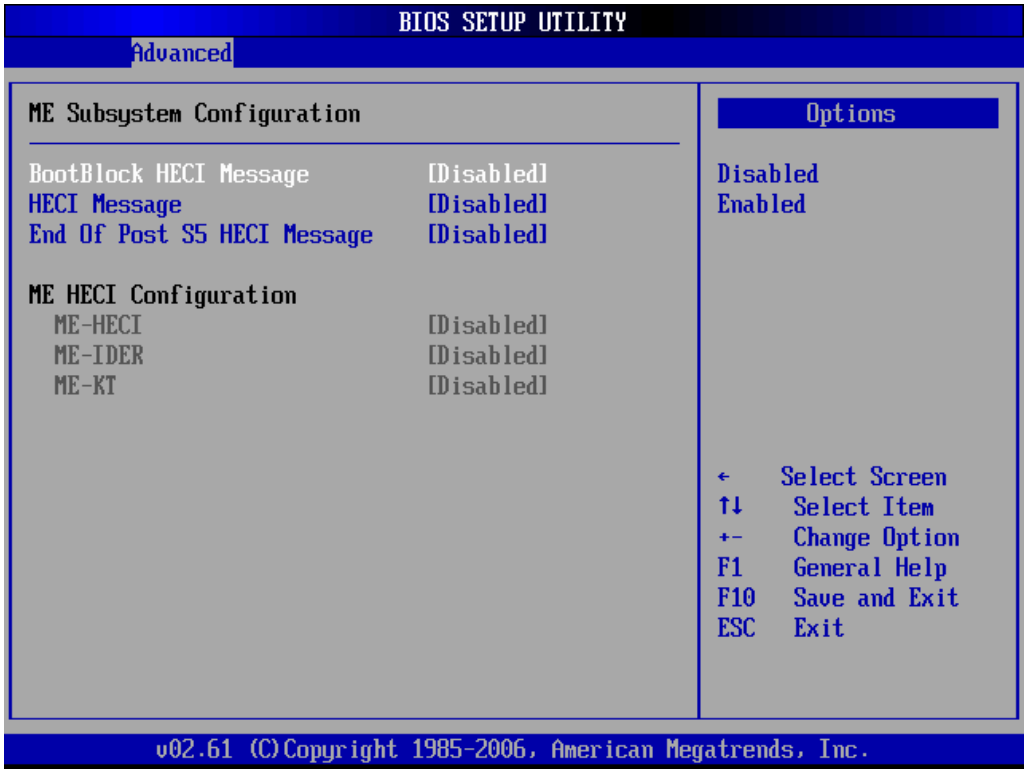

BIOS Menu 13: Me Subsystem Configuration

➔ **BootBlock HECI Message [Disabled]**

Use the **BootBlock HECI Message** option to enable or disable HECI message when booting up the system.

➔ **Disabled** **DEFAULT** The HECI message is disabled when booting up the system.

➔ **Enabled** The HECI message is enabled when booting up the system.

➔ **HECI Message [Disabled]**

Use the **HECI Message** BIOS option to enable or disable HECI message.

➔ **Disabled** **DEFAULT** The HECI message disabled.

➔ **Enabled** The HECI message enabled.

➔ **End Of Post S5 HECI Message [Disabled]**

Use the **End Of Post S5 HECI Message** option to enable or disable HECI message when the system is in the off (S5) state.

➔ **Disabled** **DEFAULT** The HECI message is disabled when the system is off.

➔ **Enabled** The HECI message enabled when the system is off.

➔ **ME-HECI [Disabled]**

The **ME-HECI** option is disabled by default and can not be changed.

➔ **ME-IDER [Disabled]**

Use the **ME-IDER** option to enable or disable the IDE-Redirection (IDE-R) function on an AMT-capable system.

➔ **Disabled** **DEFAULT** The IDE-R function is disabled.

➔ **Enabled** The IDE-R function allows an AMT-capable client system to access IDE devices and load OS from a management system. When an IDE-R session is established, the virtual drives are shown in the system.

➔ **ME-KT [Disabled]**

Use the **ME-KT** option to enable or disable the Keyboard and Text redirection (KT) function on an AMT-capable system. KT is also known as Serial-Over-Lan (SOL).

➔ **Disabled** **DEFAULT** The KT function of the ME is disabled.

➔ **Enabled** The KT function allows a management system to control an Intel® AMT client system remotely. The keyboard

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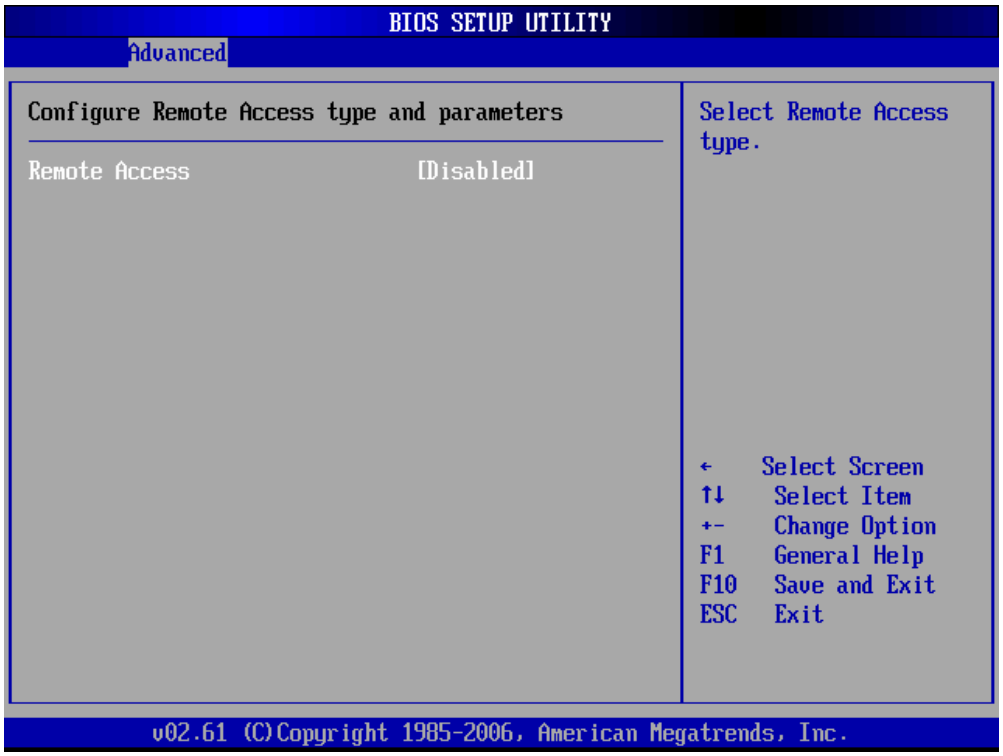
interface of a managed client system, such as BIOS menu, is displayed through the management system.

6.3.9 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 14**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.



BIOS Menu 14: Remote Access Configuration [Advanced]

➔ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

➔ **Disabled** **DEFAULT** Remote access is disabled.

➔ **Enabled** Remote access configuration options shown below appear:

- ➔ **Serial Port Number**
- ➔ **Serial Port Mode**
- ➔ **Flow Control**
- ➔ **Redirection after BIOS POST**
- ➔ **Terminal Type**
- ➔ **VT-UTF8 Combo Key Support**

These configuration options are discussed below.

6.3.10 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 15**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).

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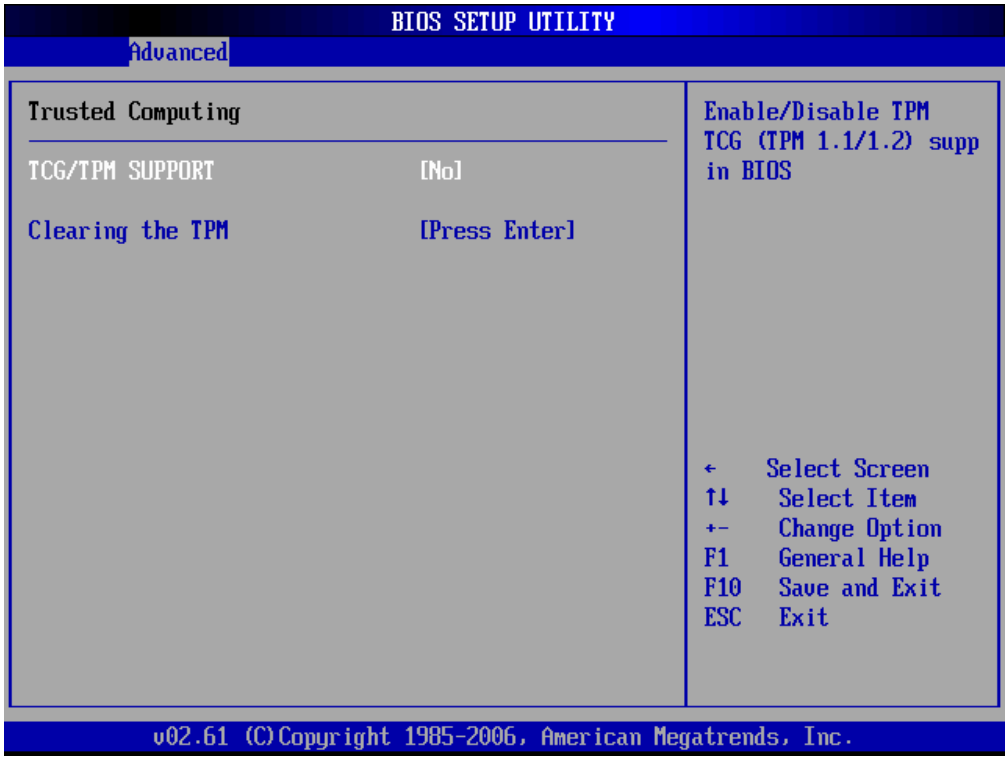


BIOS Menu 15: Trusted Computing

➔ **TCG/TPM Support [No]**

Use the **TCG/TPM Support** option to configure support for the TPM.

➔ **No** **DEFAULT** TPM support is disabled.

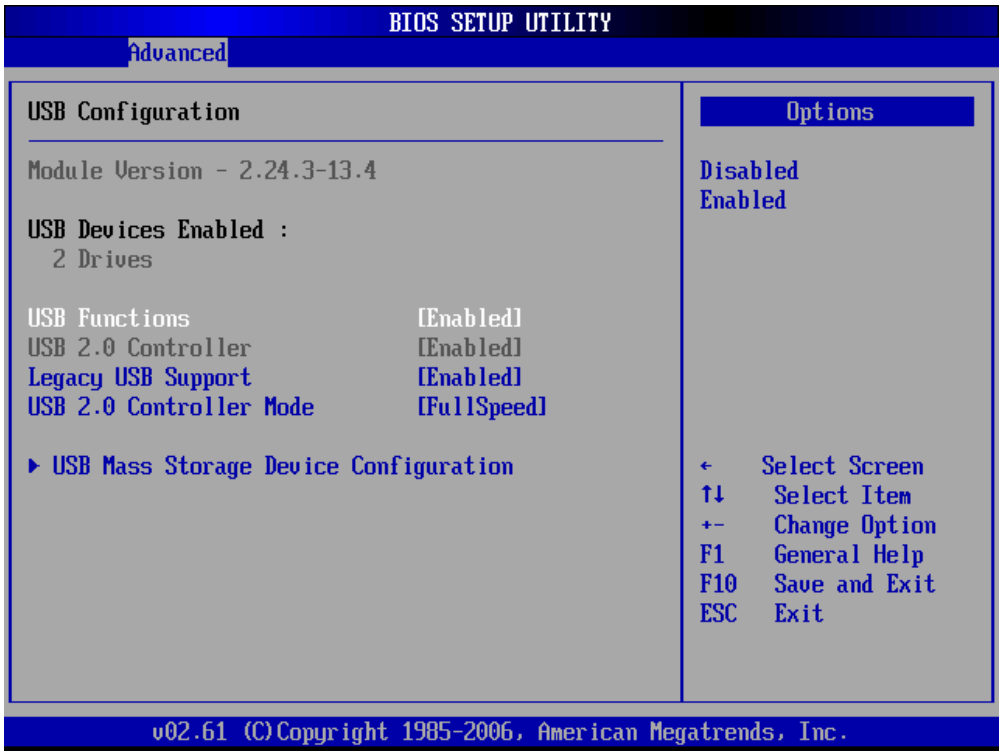
➔ **Yes** TPM support is enabled.

➔ **Clearing the TPM [Press Enter]**

Use the **Clearing the TPM** option to clear the information stored in the TPM.

6.3.11 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 16**) to read USB configuration information and configure the USB settings.



BIOS Menu 16: USB Configuration

➔ USB Configuration

The **USB Configuration** field shows the system USB configuration. The items listed are:

- Module Version: x.xxxxx.xxxxx

➔ USB Devices Enabled

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

➔ USB Function [Enabled]

Use the **USB Function** BIOS option to enable or disable USB function support.

➔ **Disabled**		USB function support disabled
➔ **Enabled**	**DEFAULT**	USB function support enabled

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➔ **USB 2.0 Controller [Enabled]**

Use the **USB 2.0 Controller** BIOS option to enable or disable the USB 2.0 controller

➔	**Disabled**		USB 2.0 controller disabled
➔	**Enabled**	**DEFAULT**	USB 2.0 controller enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔	**Disabled**		Legacy USB support disabled
➔	**Enabled**	**DEFAULT**	Legacy USB support enabled
➔	**Auto**		Legacy USB support disabled if no USB devices are connected

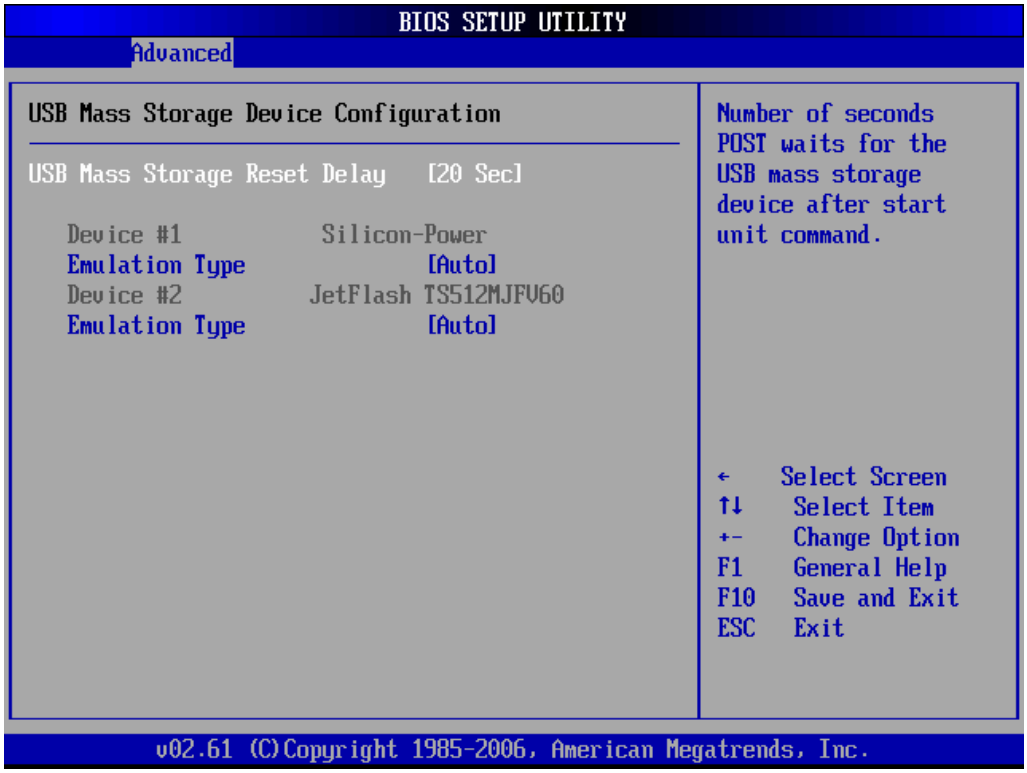
➔ **USB2.0 Controller Mode [FullSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

➔	**FullSpeed**	**DEFAULT**	The controller is capable of operating at 12Mb/s
➔	**HiSpeed**		The controller is capable of operating at 480Mb/s

6.3.11.1 USB Mass Storage Device Configuration

Use the **USB Mass Storage Device Configuration** menu (**BIOS Menu 17**) to configure USB mass storage class devices.


BIOS SETUP UTILITY
Advanced
USB Mass Storage Device Configuration
USB Mass Storage Reset Delay [20 Sec]
Device #1 Silicon-Power
Emulation Type [Auto]
Device #2 JetFlash TS512MJFV60
Emulation Type [Auto]
Number of seconds POST waits for the USB mass storage device after start unit command.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 17: USB Mass Storage Device Configuration

➔ USB Mass Storage Reset Delay [20 Sec]

Use the **USB Mass Storage Reset Delay** option to set the number of seconds POST waits for the USB mass storage device after the start unit command.

➔	**10 Sec**		POST waits 10 seconds for the USB mass storage device after the start unit command.
➔	**20 Sec**	**DEFAULT**	POST waits 20 seconds for the USB mass storage device after the start unit command.
➔	**30 Sec**		POST waits 30 seconds for the USB mass storage device after the start unit command.
➔	**40 Sec**		POST waits 40 seconds for the USB mass storage device after the start unit command.

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➔ **Device ##**

The **Device##** field lists the USB devices that are connected to the system.

➔ **Emulation Type [Auto]**

Use the **Emulation Type** BIOS option to specify the type of emulation BIOS has to provide for the USB device.

NOTE:

Please note that the device's formatted type and the emulation type provided by the BIOS must match for a device to boot properly. If both types do not match then device's behavior is undefined. To make sure both types match, format the device using BIOS INT13h calls after selecting the proper emulation option in BIOS setup. The FORMAT utility provided by Microsoft® MS-DOS®, Microsoft® Windows® 95, and Microsoft® Windows® 98 can be used for this purpose.

➔ **Auto**	**DEFAULT**	BIOS auto-detects the current USB.
➔ **Floppy**		The USB device will be emulated as a floppy drive. The device can be either A: or B: responding to INT13h calls that return DL = 0 or DL = 1 respectively.
➔ **Forced FDD**		Allows a hard disk image to be connected as a floppy image. This option works only for drives formatted with FAT12, FAT16 or FAT32.
➔ **Hard Disk**		Allows the USB device to be emulated as hard disk responding to INT13h calls that return DL values of 80h or above.

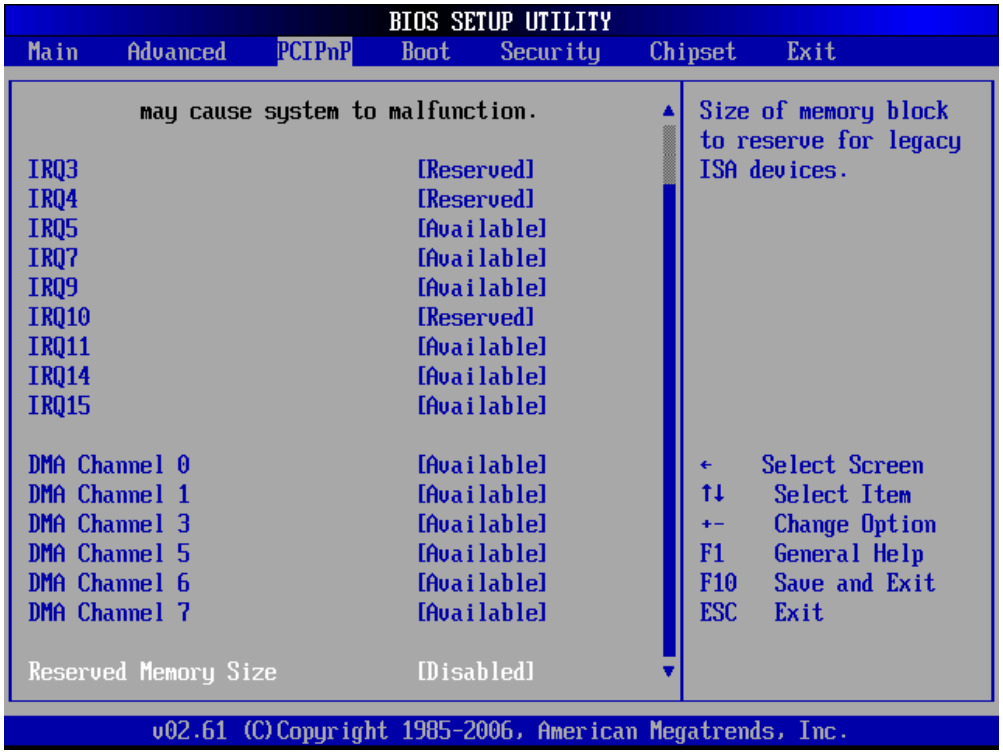
➔ **CDROM** Assumes the CD-ROM is formatted as bootable media. All the devices that support block sizes greater than 512 bytes can only be booted using this option.

6.4 PCI/PnP

Use the **PCI/PnP** menu (**BIOS Menu 18**) to configure advanced PCI and PnP settings.

WARNING!

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.



BIOS Menu 18: PCI/PnP Configuration

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➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

Available	**DEFAULT**	The specified IRQ is available to be used by PCI/PnP devices
Reserved		The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔	**Available**	**DEFAULT**	The specified DMA is available to be used by PCI/PnP devices
➔	**Reserved**		The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0

- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

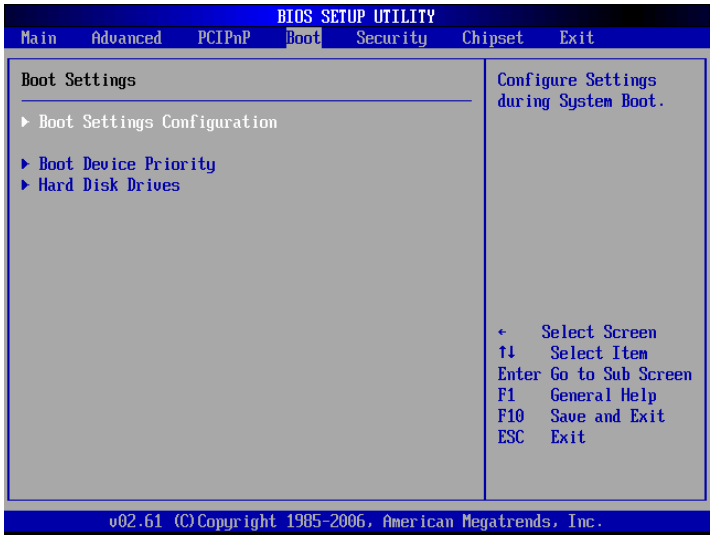
➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔	**Disabled**	**DEFAULT**	No memory block reserved for legacy ISA devices
➔	**16K**		16KB reserved for legacy ISA devices
➔	**32K**		32KB reserved for legacy ISA devices
➔	**64K**		54KB reserved for legacy ISA devices

6.5 Boot

Use the **Boot** menu (**BIOS Menu 19**) to configure system boot options.



BIOS Menu 19: Boot

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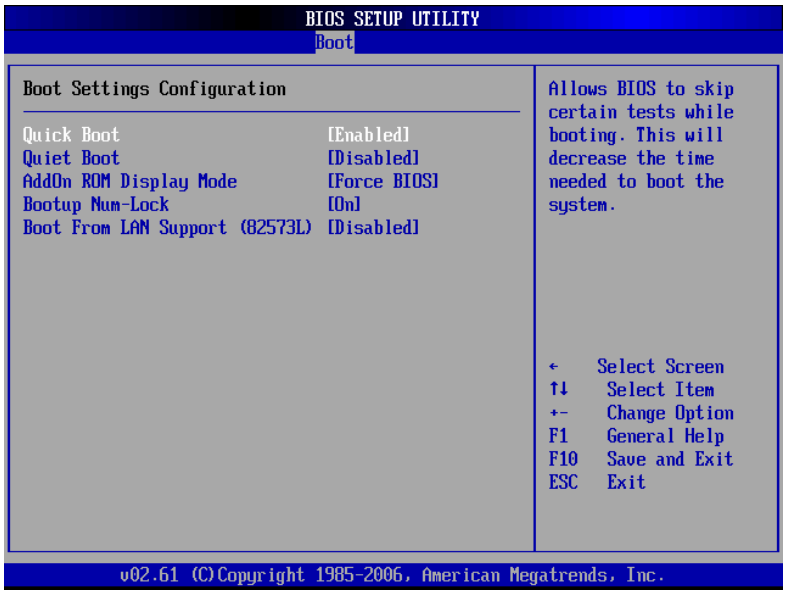
6.5.1 Boot Settings Configuration

Use the **Boot Settings Configuration** menu (**BIOS Menu 20**) to configure advanced system boot options.


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
Quiet Boot [Disabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
Boot From LAN Support (82573L) [Disabled]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 20: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled**		No POST procedures are skipped
➔ **Enabled**	**DEFAULT**	Some POST procedures are skipped to decrease the system boot time

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**	**DEFAULT**	Normal POST messages displayed
➔ **Enabled**		OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS**	**DEFAULT**	The system forces third party BIOS to display during system boot.
➔ **Keep Current**		The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **Off**		Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.
➔ **On**	**DEFAULT**	Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Boot From LAN Support (82573L) [Disabled]**

NOTE:

The Intel® ICH9DO Southbridge has an integrated GbE controller. To enable this controller to boot the system, please refer to the

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Southbridge BIOS configuration menu.

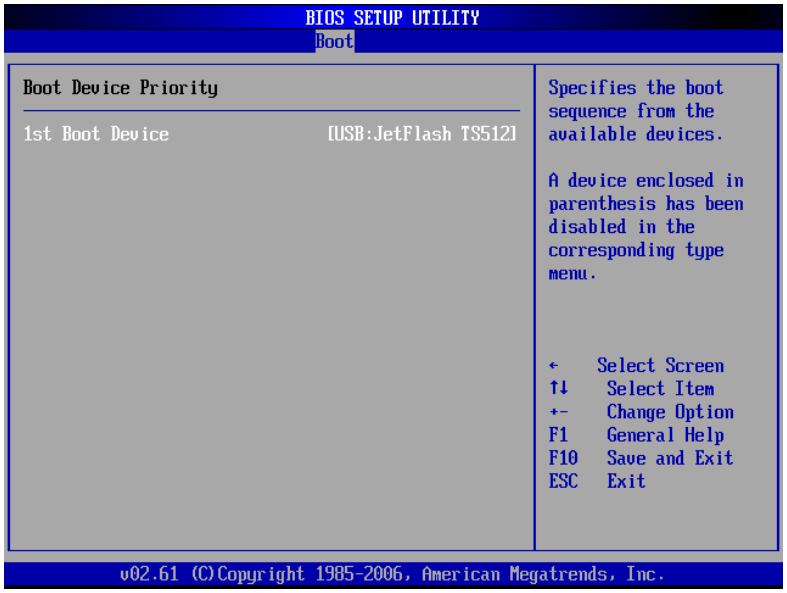
Use the **BOOT From LAN Support (82573L)** option to enable the Intel® 82573L PCIe GbE controller to boot the system.

➔	**Disabled**		Cannot be booted from a remote system through the Intel® 82573L PCIe GbE controller
➔	**Enabled**	**DEFAULT**	Can be booted from a remote system through the Intel® 82573L PCIe GbE controller

6.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 21**) to specify the boot sequence from the available devices. Possible boot devices may include:

- 1st FLOPPY DRIVE
- HDD
- CD/DVD


BIOS SETUP UTILITY
Boot
Boot Device Priority
1st Boot Device
[USB:JetFlash TS512]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 21: Boot Device Priority Settings

6.5.3 Hard Disk Drives

Use the **Hard Disk Drives** menu to specify the boot sequence of the available HDDs. When the menu is opened, the HDDs connected to the system are listed as shown below:

- 1st Drive [HDD: PM-(part number)]
- 2nd Drive [HDD: PS-(part number)]

NOTE:

Only the drives connected to the system are shown. For example, if only two HDDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available HDDs is shown. Select the first HDD the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.

BIOS Menu 22: Hard Disk Drives

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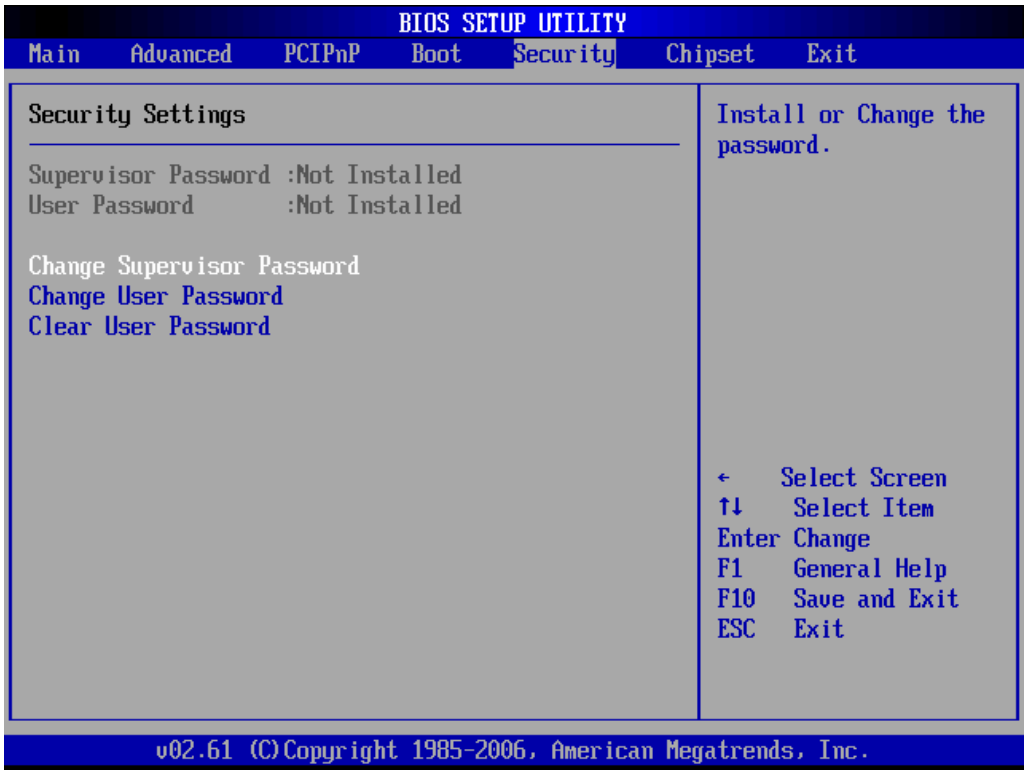
6.6 Security

Use the **Security** menu (**BIOS Menu 23**) to set system and user passwords.



BIOS Menu 23: Security

➔ **Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

➔ **Clear User Password**

Use the **Clear User Password** to clear a user's password. The default for this option is **Not Installed**. If a user password must be cleared, use this option.

6.7 Chipset

Use the **Chipset** menu (**BIOS Menu 24**) to access the Northbridge and Southbridge configuration menus

WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections
may cause system to malfunction.
North Bridge Configuration
South Bridge Configuration
Configure North Bridge features.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 24: Chipset

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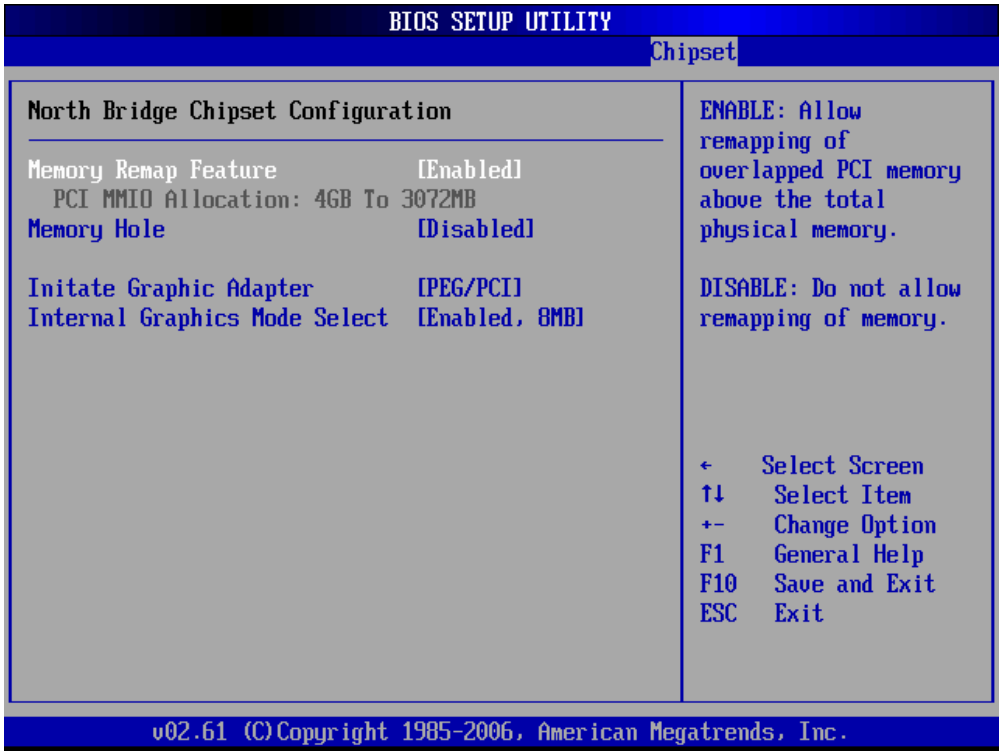
6.7.1 NorthBridge Configuration

Use the **Northbridge Chipset Configuration** menu (**BIOS Menu 25**) to configure the Northbridge chipset.


BIOS SETUP UTILITY
Chipset
North Bridge Chipset Configuration
Memory Remap Feature [Enabled]
PCI MMIO Allocation: 4GB To 3072MB
Memory Hole [Disabled]
Initate Graphic Adapter [PEG/PCI]
Internal Graphics Mode Select [Enabled, 8MB]
ENABLE: Allow remapping of overlapped PCI memory above the total physical memory.
DISABLE: Do not allow remapping of memory.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 25:Northbridge Chipset Configuration

➔ **Memory Remap Feature [Enabled]**

Use the **Memory Remap Feature** option to allow the overlapped PCI memory above the total physical memory to be remapped.

➔ **Enabled** **DEFAULT** Overlapped PCI memory can be remapped

➔ **Disabled** Overlapped PCI memory cannor be remapped

➔ **Memory Hole [Disabled]**

Use the **Memory Hole** option to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA

expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled**	**DEFAULT**	Memory is not reserved for ISA expansion cards
➔ **15MB – 16MB**		Between 15MB and 16MB of memory is reserved for ISA expansion cards

➔ **Initiate Graphic Adapter [PEG/PCI]**

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PEG/IGD
- PEG/PCI **DEFAULT**
- PCI/PEG
- PCI/IGD

➔ **Internal Graphics Mode Select [Enable, 8MB]**

Use the **Internal Graphic Mode Select** option to specify the amount of system memory that can be used by the Internal graphics device.

➔ **Disable**		
➔ **Enable, 1MB**		1MB of memory used by internal graphics device
➔ **Enable, 8MB**	**DEFAULT**	8MB of memory used by internal graphics device

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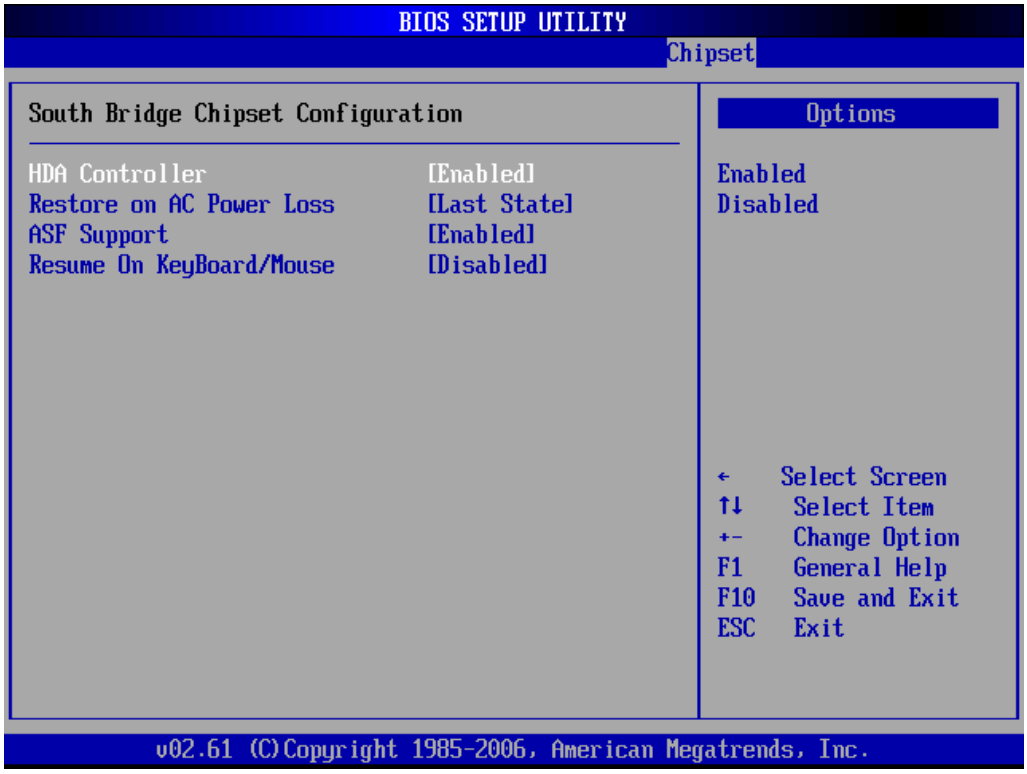
6.7.2 Southbridge Configuration

The **Southbridge Configuration** menu (**BIOS Menu 26**) the Southbridge chipset to be configured.



BIOS Menu 26:Southbridge Chipset Configuration

➔ **HDA Controller [Enabled]**

Use the **HDA Controller** option to enable or disable the High Definition audio codec.

➔ **Disabled** The onboard High Definition audio codec is disabled

➔ **Enabled** **DEFAULT** The onboard High Definition audio codec automatically detected and enabled

➔ **Restore on AC Power Loss [Power Off]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔ **Power Off** The system remains turned off

➔ **Power On** **DEFAULT** The system turns on

➔ **Last State** The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ **ASF Support [Enabled]**

Use the **ASF Support** BIOS option to control the system's ability to connect to a remote management server.

➔ **Disabled** The system will not communicate with a remote management server.

➔ **Enabled** **DEFAULT** The Alert Standard Format (ASF) controller is activated and can communicate with a remote management server.

➔ **Resume on KeyBoard/Mouse [Disabled]**

The **Resume on KeyBoard/Mouse** BIOS option specifies if the system is roused from a suspended or standby state when there is activity on the keyboard or mouse.

➔ **Disabled** **DEFAULT** Neither keyboard activity nor mouse activity can rouse the system from a suspend stated.

➔ **Resume On Keyboard** Wake event only generated by keyboard activity

➔ **Resume On Mouse** Wake event only generated by mouse activity

➔ **Enabled** Wake event generated by keyboard and mouse activity

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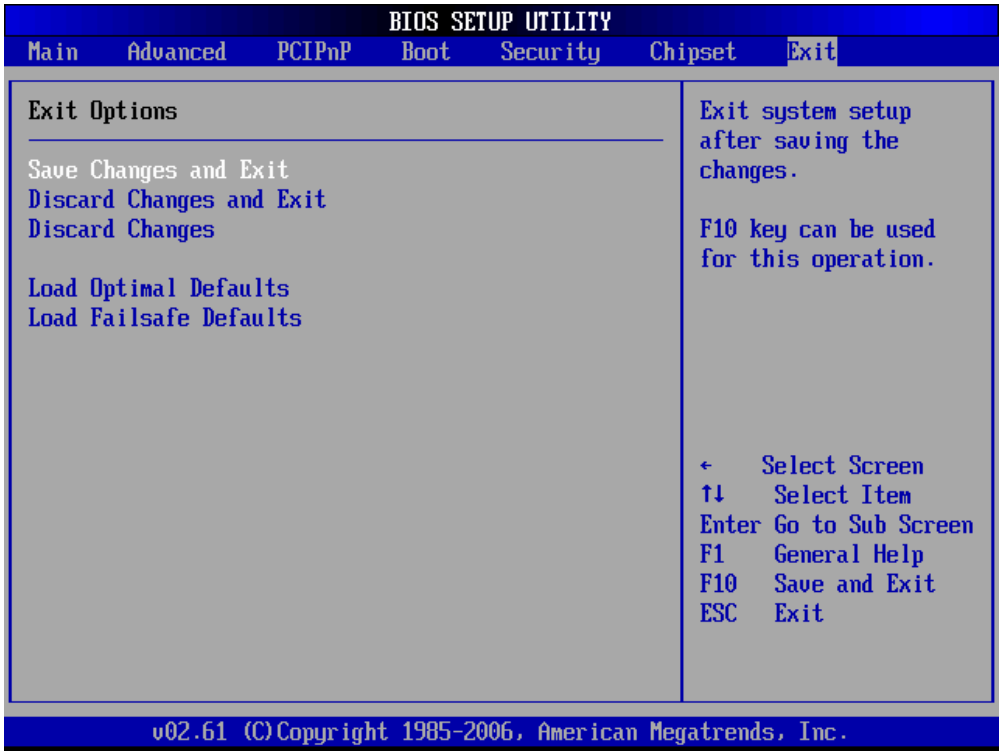
6.8 Exit

Use the **Exit** menu (**BIOS Menu 27**) to load default BIOS values, optimal failsafe values and to save configuration changes.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 27:Exit

➔ Save Changes and Exit

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ Discard Changes and Exit

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

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Chapter

7

Software Drivers

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7.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the CyberResearch website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Intel® chipset driver
- LAN driver
- Audio driver

Installation instructions are given below.

7.2 Driver CD Auto-run

All the drivers for the MMGA are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the system does not initiate the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (where **X:** is the system CD drive) to access the Driver CD main menu.

Step 2: The driver main menu appears (**Figure 6-1**).

Figure 6-1: Introduction Screen

Step 3: Click Install Drivers, then select your product from the list that appears (list not shown).

Step 4: A new screen with a list of available drivers appears (**Figure 6-2**).

Figure 6-2: Available Drivers

Step 5: Select the driver to install from the list in **Figure 6-2**. Detailed driver installation instructions follow below.

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7.3 Intel® Chipset Driver

To install the Intel® chipset driver, please follow the steps below.

Step 1: Select **MMGA** from the list in **Figure 6-1**.

Step 2: Select **INF** from the list in **Figure 6-2**.

Step 3: The window shown in **Figure 6-3** appears.

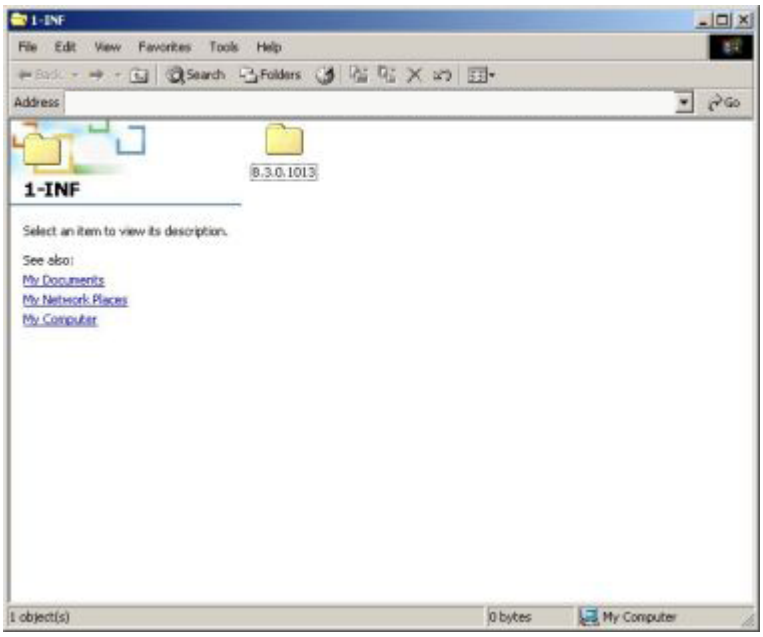

Figure 6-3: Intel® Chipset Driver Directory

Step 4: Click on the directory icon in **Figure 6-3**.

Step 5: The window in **Figure 6-4** appears.

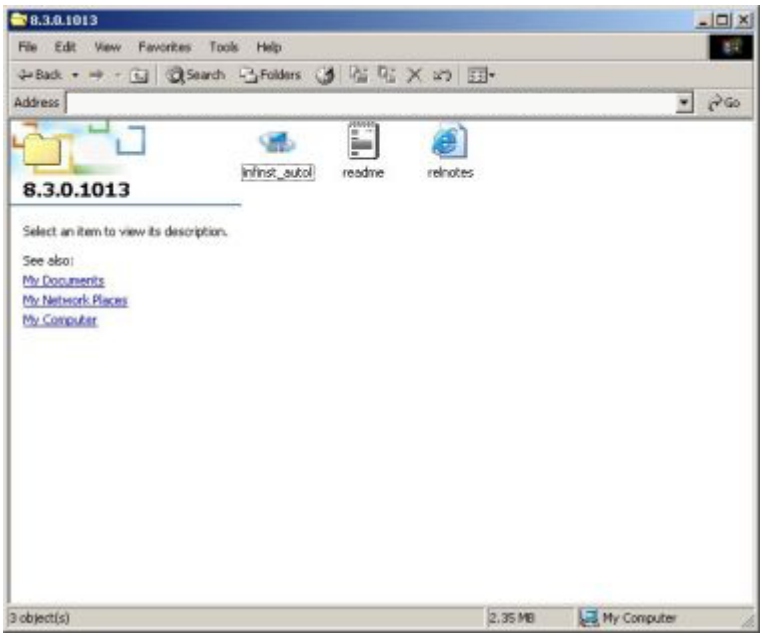

Figure 6-4: Intel® Chipset Driver Setup Icon

Step 6: Click on the **infinst_autol** setup icon in **Figure 6-4**.

Step 7: The **Intel® Package Manager** begins to extract the installation files. See **Figure 6-5**.

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Figure 6-5: Intel® Package Manager

Step 8: The **Intel® Setup Welcome** screen. See **Figure 6-6**.

Intel® Chipset Device Software
Intel® Chipset Device Software
Welcome to the Setup Program
This setup program will install the Intel® Chipset Device Software onto this computer. It is strongly recommended that you exit all Windows® programs before continuing.
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-6: Intel® Setup Welcome Screen

Step 9: Click **NEXT** to continue.

Step 10: The Intel® license agreement in appears.

Intel® Chipset Device Software
Intel® Chipset Device Software
License Agreement
intel
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
< Back
Yes
No
Intel® Installation Framework

Figure 6-7: Intel® Chipset Driver License Agreement

Step 11: Accept the terms and conditions by clicking **YES**.

Step 12: The **Readme** file in **Figure 6-8** appears.

Intel® Chipset Device Software
Intel® Chipset Device Software
Readme File Information
intel
Refer to the Readme file below to view the system requirements and installation information.
Press the Page Down key to view the rest of the file.
* Product: Intel(R) Chipset Device Software
* Release: Production Version
* Version: 8.3.0.1013
* Target Chipset#: Q33/G33/G31/P35
* Date: March 05 2007
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-8: Readme File

Step 13: Click **NEXT** to continue.

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Step 14: The driver is then installed.

Step 15: When the installation process is complete, the Setup Complete screen appears.

See **Figure 6-9**.

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Is Complete
intel
The setup program successfully installed the Intel® Chipset Device Software onto this computer. Click Finish to complete the setup process.
Finish
Intel® Installation Framework

Figure 6-9: Intel® Chipset Driver Complete Installation Screen

Step 16: To complete the chipset driver installation, click **FINISH**.

7.4 Intel® Graphics Media Accelerator Driver

To install the chipset driver, please follow the steps below:

Step 1: Select the VGA driver from the list in **Figure 6-2**.

Step 2: A new window opens. See **Figure 6-10**.

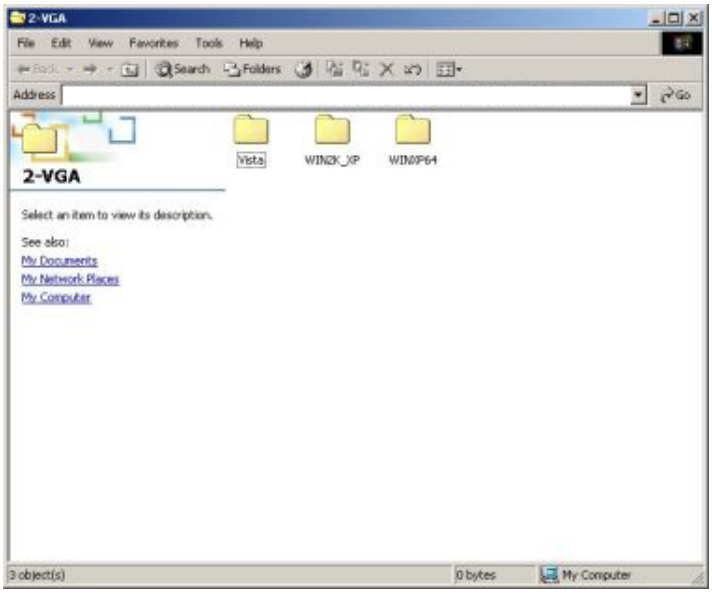

Figure 6-10: Select the Operating System

Step 3: Select the operating system from those shown in **Figure 6-10**.

Step 4: A new window appears. See **Figure 6-11**.

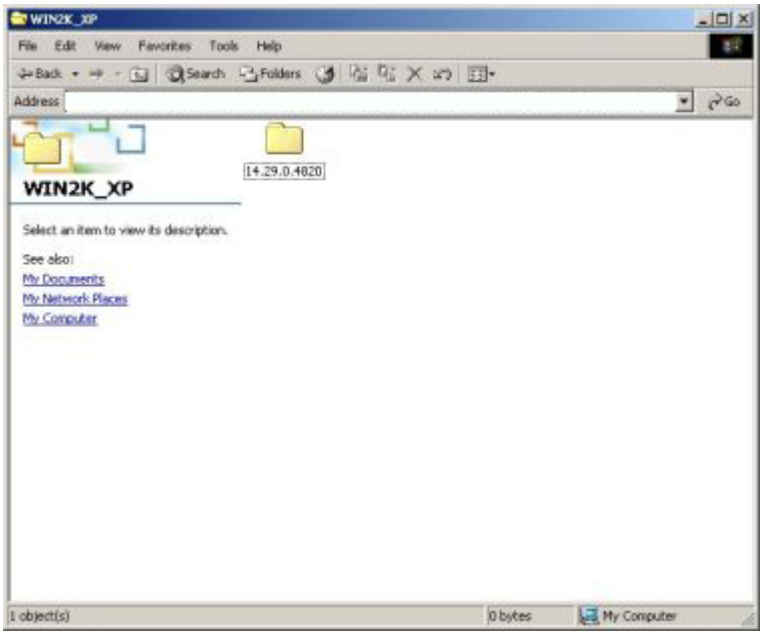

Figure 6-11: Intel® Driver Directory

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Step 5: Click the directory icon in **Figure 6-11**.

Step 6: A new window appears. See **Figure 6-12**.

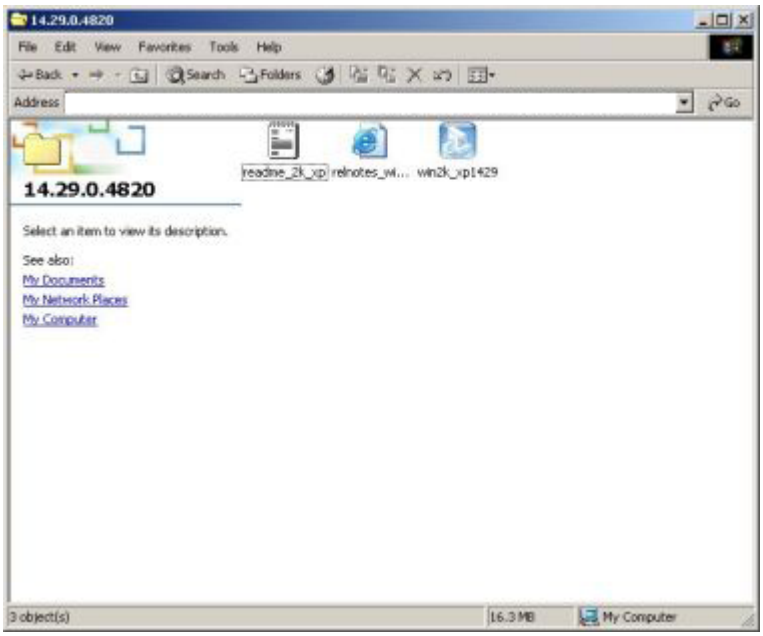

Figure 6-12: Intel® VGA Driver Setup Icon

Step 7: Click on the VGA driver installation icon in See **Figure 6-12**.

Step 8: The Readme information file shown in **Figure 6-13** appears.

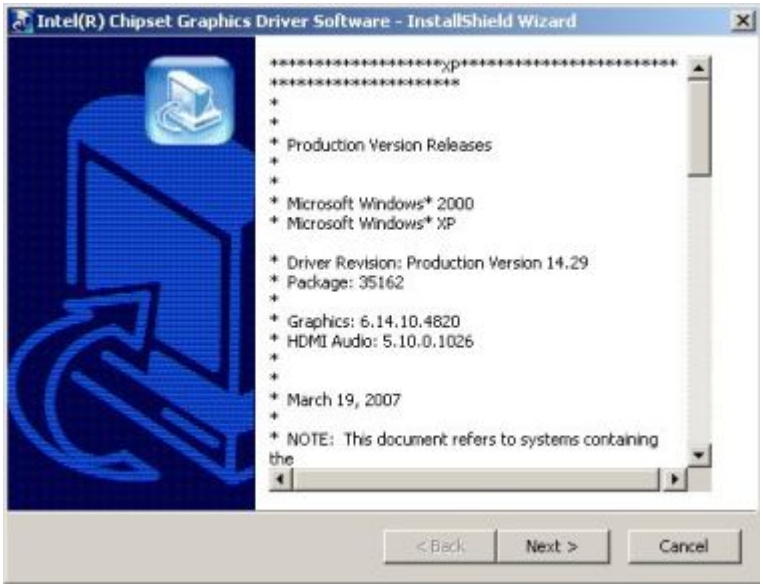
Intel(R) Chipset Graphics Driver Software - InstallShield Wizard
* Production Version Releases
* Microsoft Windows* 2000
* Microsoft Windows* XP
* Driver Revision: Production Version 14.29
* Package: 35162
* Graphics: 6.14.10.4820
* HDMI Audio: 5.10.0.1026
* March 19, 2007
* NOTE: This document refers to systems containing
the
< Back
Next >
Cancel

Figure 6-13: GMA Driver Readme File

Step 9: Click **NEXT** to extract the GMA driver files. See **Figure 6-14**.

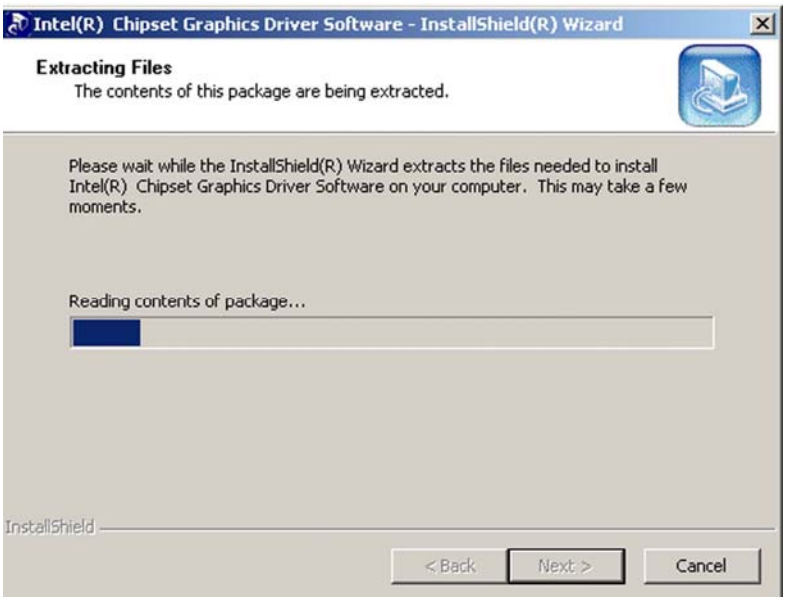
Intel(R) Chipset Graphics Driver Software - InstallShield(R) Wizard
Extracting Files
The contents of this package are being extracted.
Please wait while the InstallShield(R) Wizard extracts the files needed to install Intel(R) Chipset Graphics Driver Software on your computer. This may take a few moments.
Reading contents of package...
InstallShield
< Back
Next >
Cancel

Figure 6-14: GMA Driver File Extraction

Step 10: The welcome screen shown in **Figure 6-15** appears.

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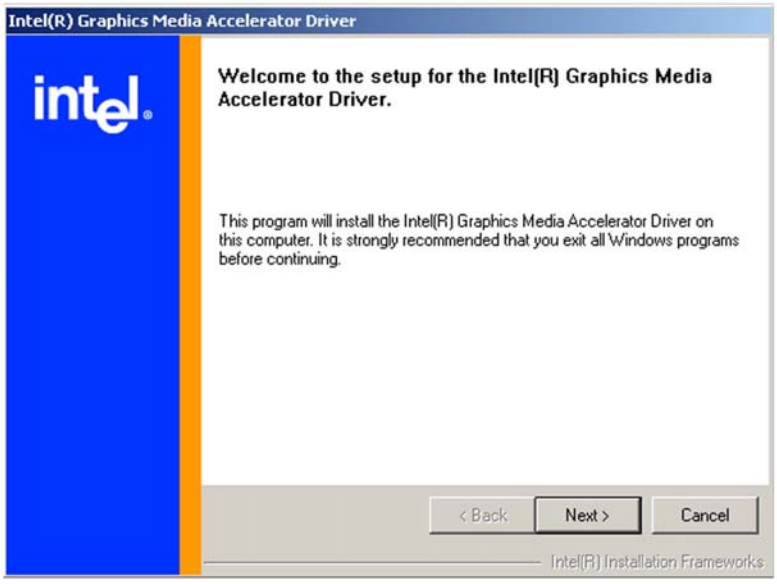
Intel(R) Graphics Media Accelerator Driver
intel
Welcome to the setup for the Intel(R) Graphics Media Accelerator Driver.
This program will install the Intel(R) Graphics Media Accelerator Driver on this computer. It is strongly recommended that you exit all Windows programs before continuing.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 6-15: GMA Driver Installation Welcome Screen

Step 11: To continue the installation process, click **NEXT**.

Step 12: The license agreement in **Figure 6-16** appears.

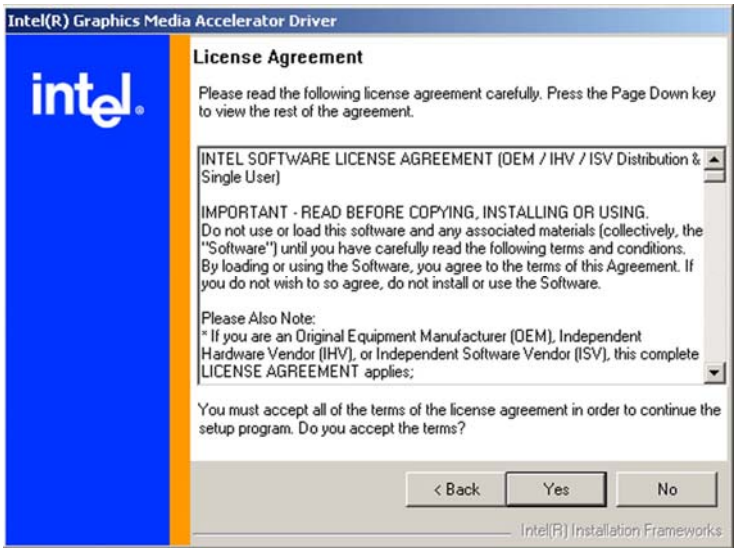
Intel(R) Graphics Media Accelerator Driver
intel
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 6-16: GMA Driver License Agreement

Step 13: Click the **YES** in **Figure 6-16** to continue.

Step 14: The installation notice shown in **Figure 6-17** appears.

Figure 6-17: GMA Driver Installing Notice

Step 15: A confirmation screen shown in **Figure 6-18** appears.

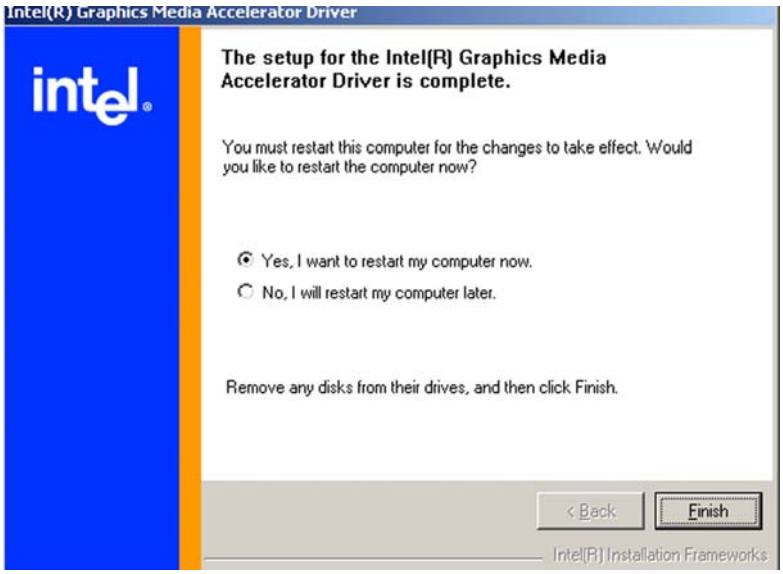
Intel(R) Graphics Media Accelerator Driver
intel
The setup for the Intel(R) Graphics Media Accelerator Driver is complete.
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish.
< Back
Finish
Intel(R) Installation Frameworks

Figure 6-18: GMA Driver Installation Complete

Step 16: After selecting when to restart the computer in **Figure 6-18**, click **FINISH**.

7.5 Intel® 82566DM Gigabit LAN Connect Device Driver

To install the Intel® 82566DM Gigabit LAN connect device driver, please follow the steps below.

Step 1: Select **LAN** from the list in **Figure 6-2**.

Step 2: The window in **Figure 6-19** appears.

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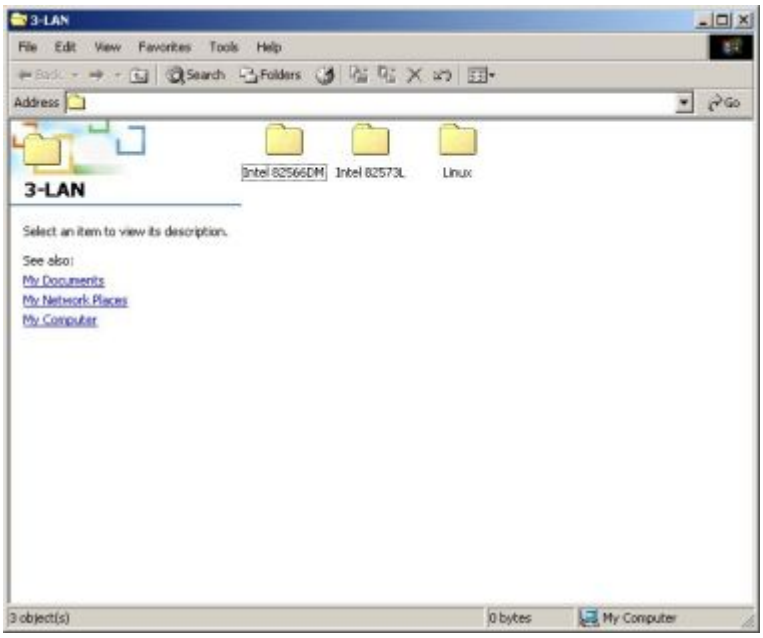

Figure 6-19: Intel® 82566DM Driver Directory Icon

Step 3: Click on the **Intel® 82566DM** directory icon in **Figure 6-19**.

Step 4: The window in **Figure 6-20** appears.

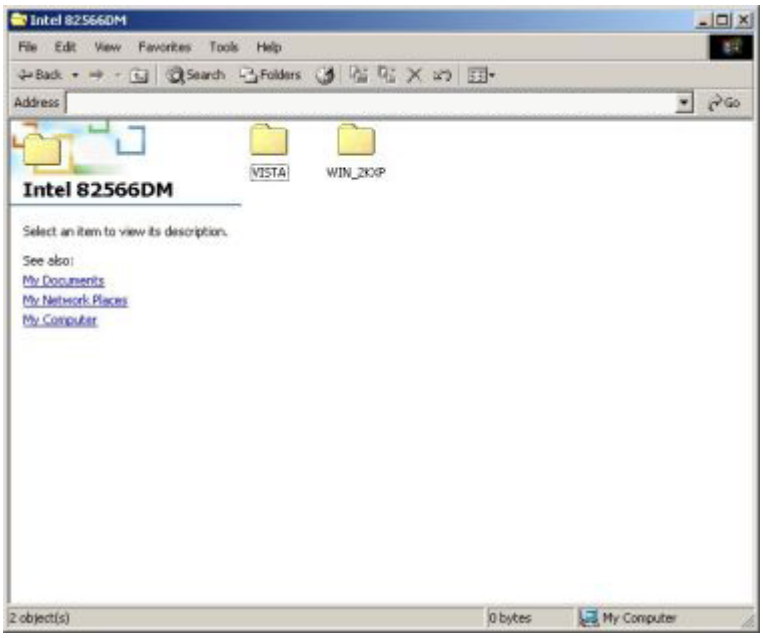

Figure 6-20: Intel® 82566DM Operating System

Step 5: Select the Operating System in **Figure 6-20**.

Step 6: The window in **Figure 6-21**appears.

Step 7: In **Figure 6-21** select the operating system type installed on the system.

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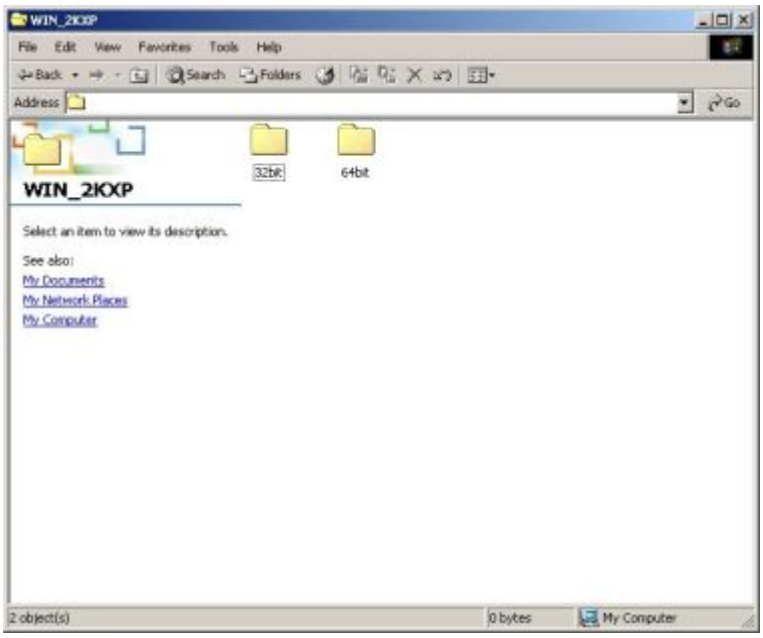

Figure 6-21: Select Operating System Type

Step 8: The window in **Figure 6-22** appears.

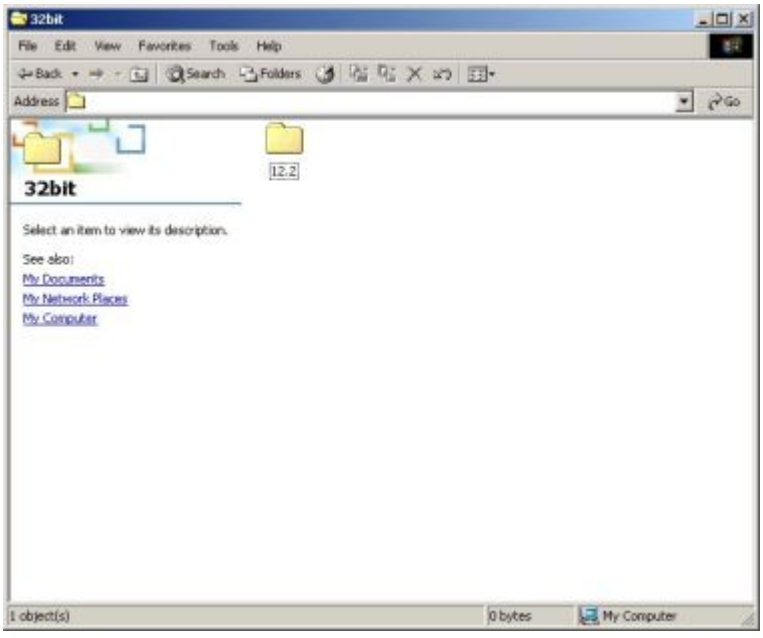

Figure 6-22: Driver Directory

Step 9: Click on the directory icon in **Figure 6-22**.

Step 10: A window containing the Intel® 82566DM driver startup icon appears. See **Figure 6-23**.

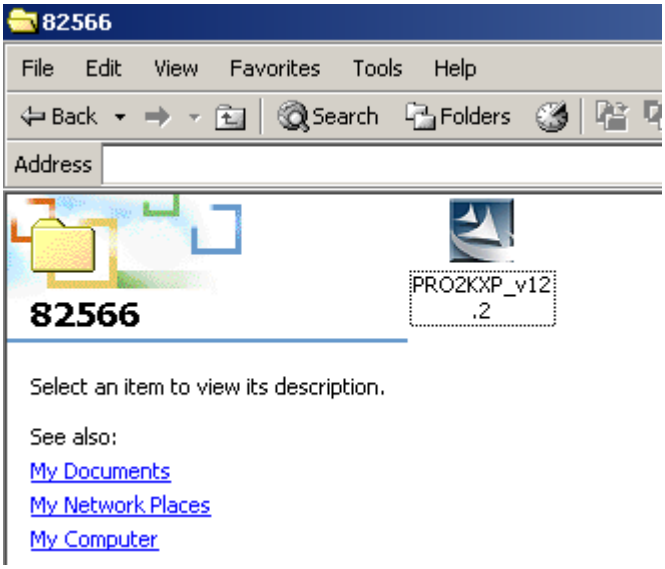

Figure 6-23: Intel® 82566DM Device Driver Startup Icon

Step 11: Double click the Intel® 82566DM driver startup icon in **Figure 6-23**.

Step 12: The driver begins to extract the installation files.

Step 13: The **Welcome** screen in **Figure 6-24** appears next.

Step 14: Click **NEXT** to continue.

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Intel(R) PRO Network Connections - InstallShield Wizard
Welcome to the InstallShield Wizard for
Intel(R) PRO Network Connections
Installs drivers, Intel(R) PROSet for Windows* Device Manager, and Advanced Networking Services.
WARNING: This program is protected by copyright law and international treaties.
InstallShield
< Back
Next >
Cancel

Figure 6-24: Intel® 82566DM Welcome Screen

Step 15: The license agreement in **Figure 6-25** appears.

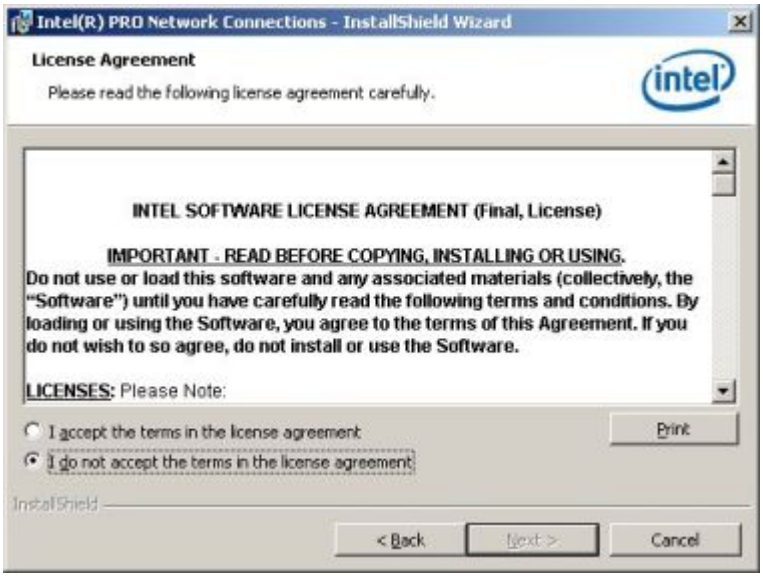
Intel(R) PRO Network Connections - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
INTEL SOFTWARE LICENSE AGREEMENT (Final, License)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
LICENSES: Please Note:
I accept the terms in the license agreement
I do not accept the terms in the license agreement
Print
InstallShield
< Back
Next >
Cancel

Figure 6-25: Intel® 82566DM Driver License Agreement

Step 16: Accept the conditions of the license agreement and click **NEXT** to continue.

Step 17: The **Setup Options** screen in **Figure 6-26** appears next.

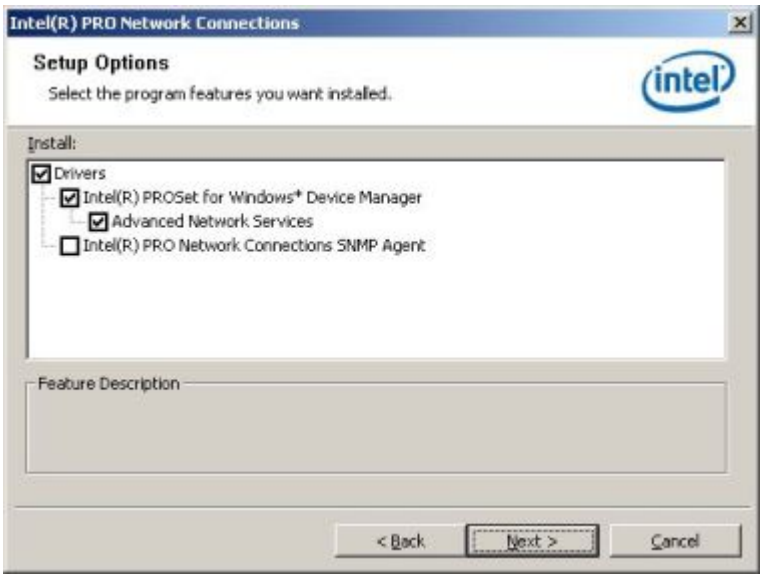

Figure 6-26: Intel® 82566DM Driver Setup Options

Step 18: Select the required installation configuration in **Figure 6-26** and click **NEXT** to continue.

Step 19: The **Ready to Install the Program** window in **Figure 6-27** appears.

Intel(R) PRO Network Connections - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Figure 6-27: Intel® 82566DM Driver Installation Ready Window

Step 20: Click **INSTALL** in **Figure 6-27**.

Step 21: The program starts to install the driver. The window in appears.

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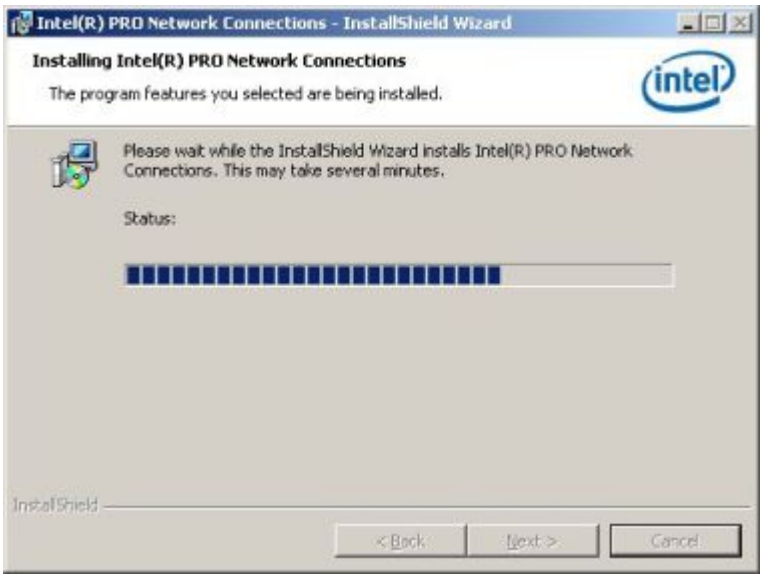
Intel(R) PRO Network Connections - InstallShield Wizard
Installing Intel(R) PRO Network Connections
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs Intel(R) PRO Network Connections. This may take several minutes.
Status:
InstallShield
< Back
Next >
Cancel

Figure 6-28: Intel® 82566DM Driver Installation Progress

Step 22: When the installation is finished. Click **FINISH** in the termination screen.

7.6 Intel® 82573 PCI Express Gigabit Ethernet Controller Driver

To install the Intel® 82573 PCIe GbE controller, please follow the steps below.

Step 1: Select **LAN** from the list in **Figure 6-2**.

Step 2: The window in **Figure 6-29** appears.

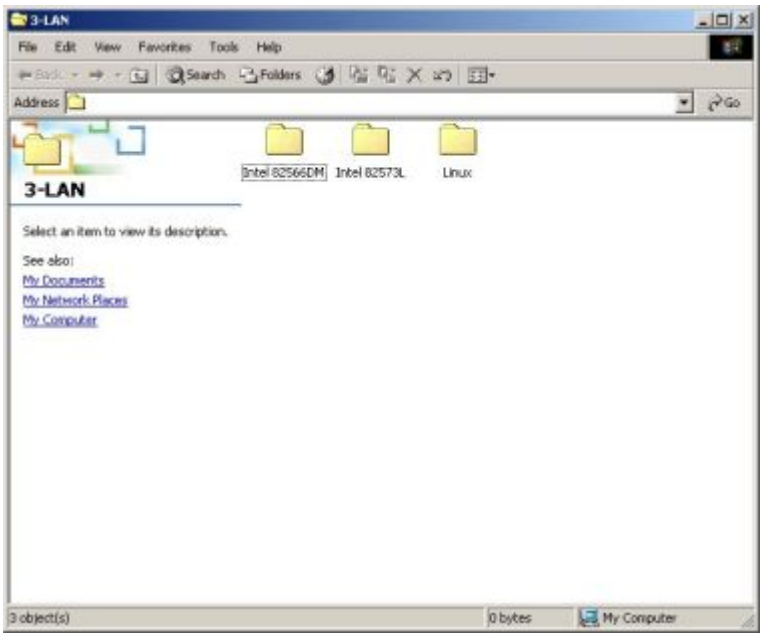

Figure 6-29: Intel® 82573 Driver Directory Icon

Step 3: Click on the **Intel® 82573L** directory icon in **Figure 6-29**.

Step 4: The window in **Figure 6-30** appears.

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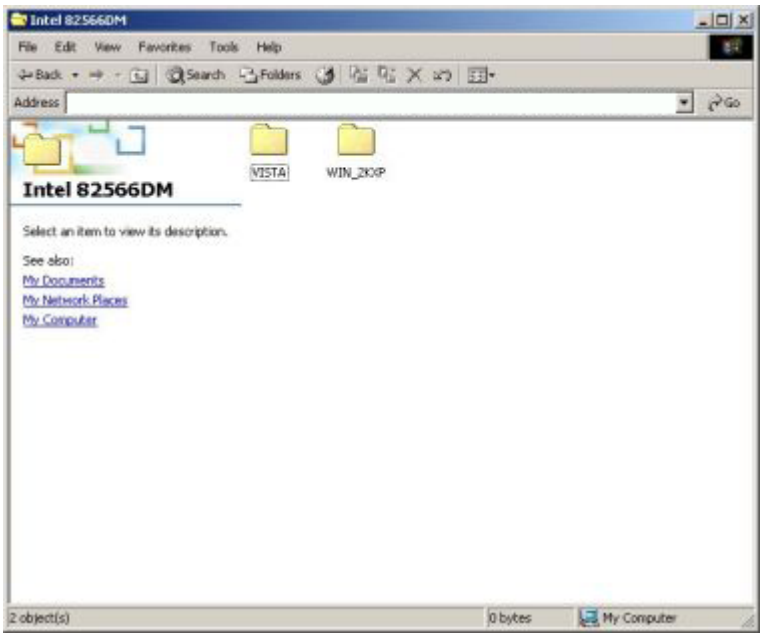

Figure 6-30: Intel® 82573 Operating System

Step 5: Select the Operating System in **Figure 6-30**.

Step 6: The window in **Figure 6-31** appears.

Step 7: In **Figure 6-31** select the operating system type installed on the system.

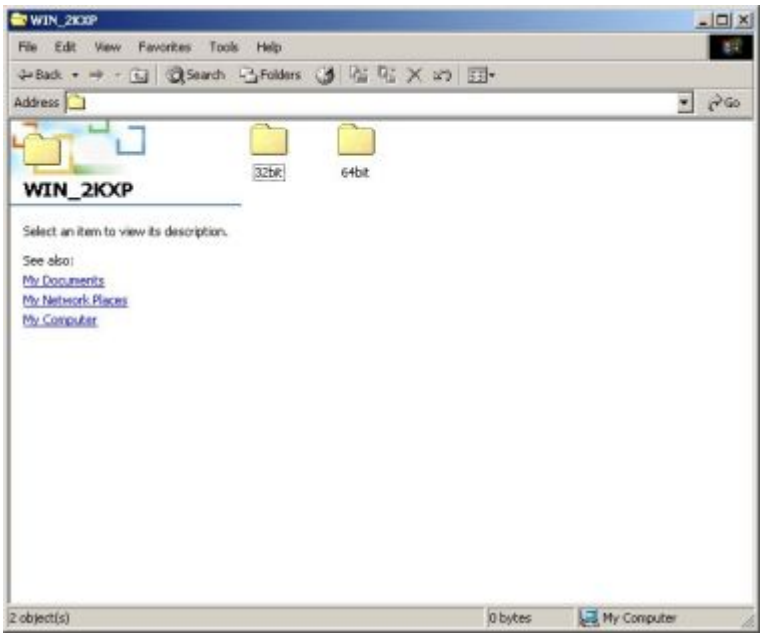

Figure 6-31: Select Operating System Type

Step 8: The window in **Figure 6-32** appears.

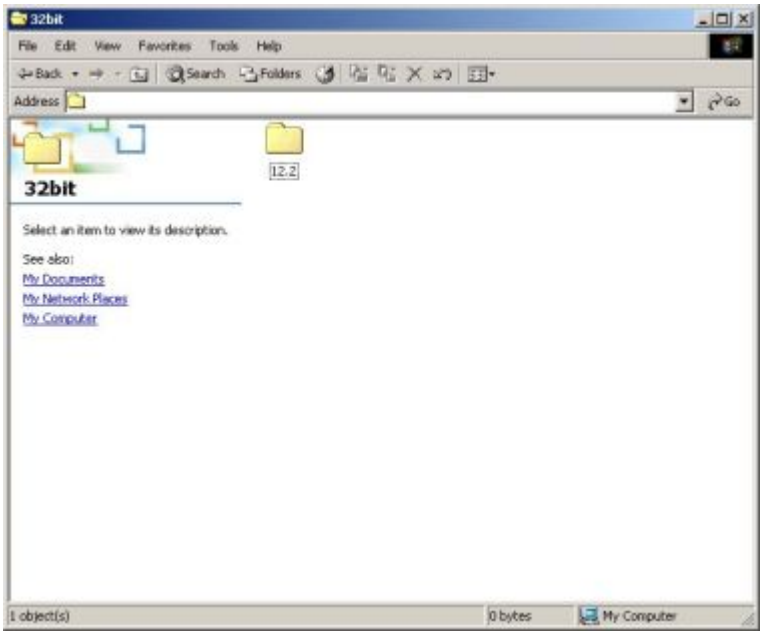

Figure 6-32: Driver Directory

Step 9: Click on the directory icon in **Figure 6-22**.

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Step 10: A window containing the Intel® 82573 driver startup icon appears. See **Figure 6-32**.

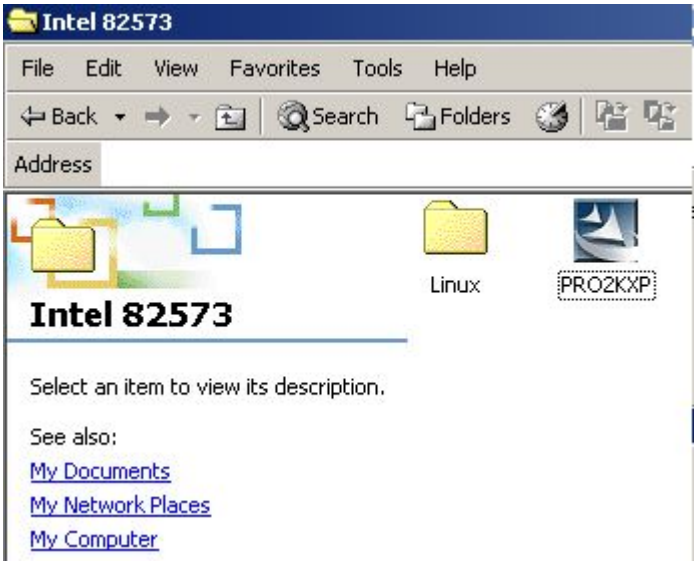

Figure 6-33: Intel® 82573 Driver Startup Icon

Step 11: Click the startup icon in **Figure 6-33**.

Step 12: The **License Agreement** for the Intel® 82573 appears. See **Figure 6-34**.

DriverInstaller - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
INTEL SOFTWARE LICENSE AGREEMENT
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel

Figure 6-34: Intel® 82573 License Agreement

Step 13: Accept the license terms and agreements in and click **NEXT** to continue.

Step 14: Next, select the directory in which the files must be saved. See **Figure 6-35**.

DriverInstaller - InstallShield Wizard
Location to Save Files
Where would you like to save your files?
Please enter the folder where you want these files saved. If the folder does not exist, it will be created for you. To continue, click Next.
Save files in folder:
c:\Intel11.1
Change...
InstallShield
< Back
Next >
Cancel

Figure 6-35: Intel® 82573 File Location Select

Step 15: Click **NEXT** to continue.

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Step 16: The driver begins to extract the installation files. See **Figure 6-36**.

DriverInstaller - InstallShield Wizard
Extracting Files
The contents of this package are being extracted.
Please wait while the InstallShield Wizard extracts the files needed to install DriverInstaller on your computer. This may take a few moments.
Extracting Autorun.exe...
InstallShield
< Back
Next >
Cancel

Figure 6-36: Intel® 82573 Installation Files Extraction

Step 17: The Intel® PRO Network Connections window appears. See **Figure 6-37**.

Figure 6-37: Intel® PRO Network Connections window

Step 18: Click **INSTALL DRIVERS** in **Figure 6-37**.

Step 19: The **Intel® PRO Network Connections Welcome** screen in **Figure 6-38** appears.

Intel(R) PRO Network Connections - InstallShield Wizard
Welcome to the InstallShield Wizard for Intel(R) PRO Network Connections
intel
Installs drivers, Intel(R) PROSet for Windows* Device Manager, and Advanced Networking Services.
WARNING: This program is protected by copyright law and international treaties.
InstallShield
< Back
Next >
Cancel

Figure 6-38: Intel® PRO Network Connections Welcome

Step 20: Click **NEXT** to continue.

Step 21: A new **License Agreement** appears. See **Figure 6-39**.

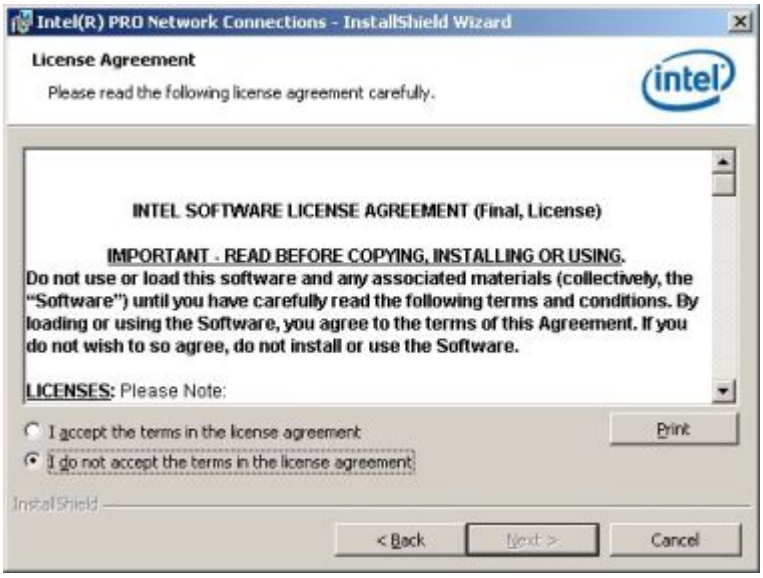
Intel(R) PRO Network Connections - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
intel
INTEL SOFTWARE LICENSE AGREEMENT (Final, License)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
LICENSES: Please Note:
I accept the terms in the license agreement
I do not accept the terms in the license agreement
Print
InstallShield
< Back
Next >
Cancel

Figure 6-39: License Agreement

Step 22: Accept the terms and conditions in **Figure 6-39** and click **NEXT** to continue.

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Step 23: The **Setup Type** window in **Figure 6-40** appears.

Intel(R) PRO Network Connections - InstallShield Wizard
Setup Type
Choose the setup type that best suits your needs.
intel
Please select a setup type.
Complete
Installs drivers, Intel(R) PROSet for Windows* Device Manager, and Advanced Networking Services.
Custom
Choose which program features you want installed and where they will be installed. Recommended for advanced users.
InstallShield
< Back
Next >
Cancel

Figure 6-40: Setup Type

Step 24: Select the setup type in **Figure 6-40** and click **NEXT** to continue.

Step 25: The drivers are installed. See **Figure 6-41**.

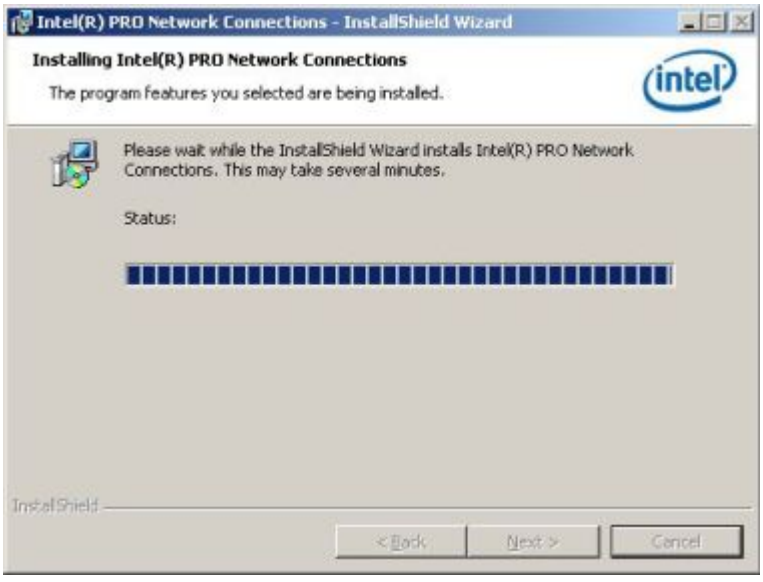
Intel(R) PRO Network Connections - InstallShield Wizard
Installing Intel(R) PRO Network Connections
The program features you selected are being installed.
intel
Please wait while the InstallShield Wizard installs Intel(R) PRO Network Connections. This may take several minutes.
Status:
InstallShield
< Back
Next >
Cancel

Figure 6-41: Intel® 82573 Driver Installation Progress

Step 26: When the driver is installed. Click **FINISH** in the termination screen.

7.7 Realtek HD Audio Driver (ALC883) Installation

To install the Realtek High Definition (HD) Audio driver, please follow the steps below.

NOTE:

This driver only needs to be installed if an external audio kit with a RealTek ALC883 codec is installed.

7.7.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Enable the High Definition Audio controller.

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

7.7.2 Driver Installation

To install the audio driver please follow the steps below.

Step 1: Select **AUDIO** from the list in **Figure 6-2**.

Step 2: A new window opens (**Figure 6-42**).

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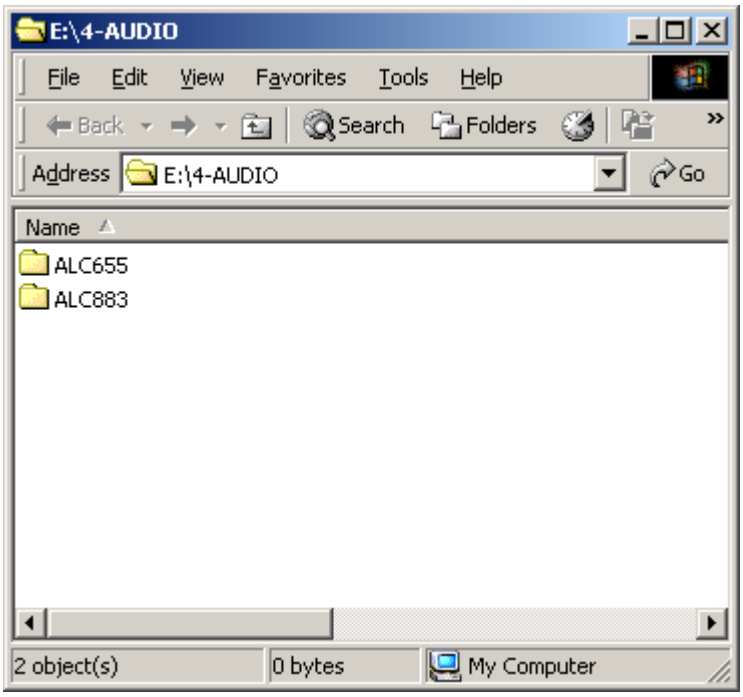

Figure 6-42: Select the Audio CODEC

Step 3: Double-click the ALC883 folder.

Step 4: Double-click the appropriate operating system folder (**Figure 6-43**).

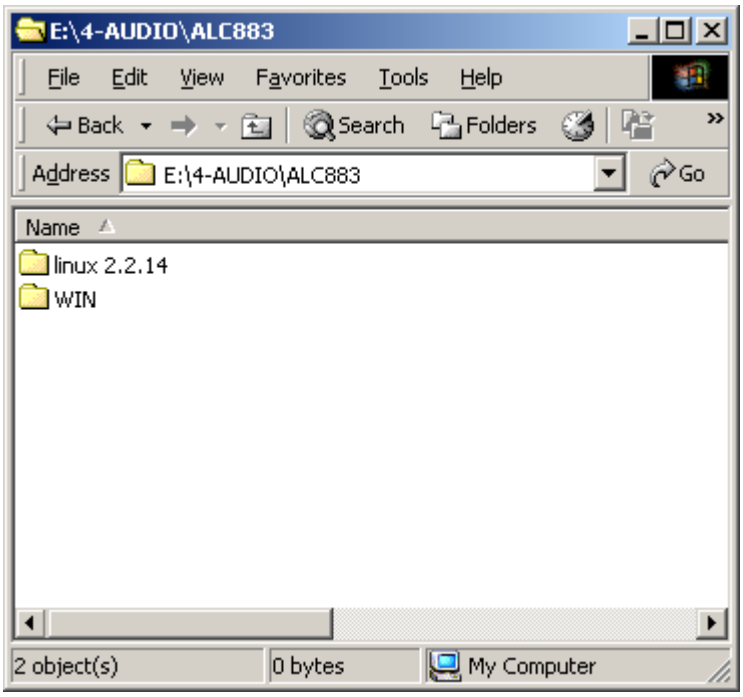

Figure 6-43: Select the OS

Step 5: Double-click the appropriate operating system version folder (**Figure 6-44**).

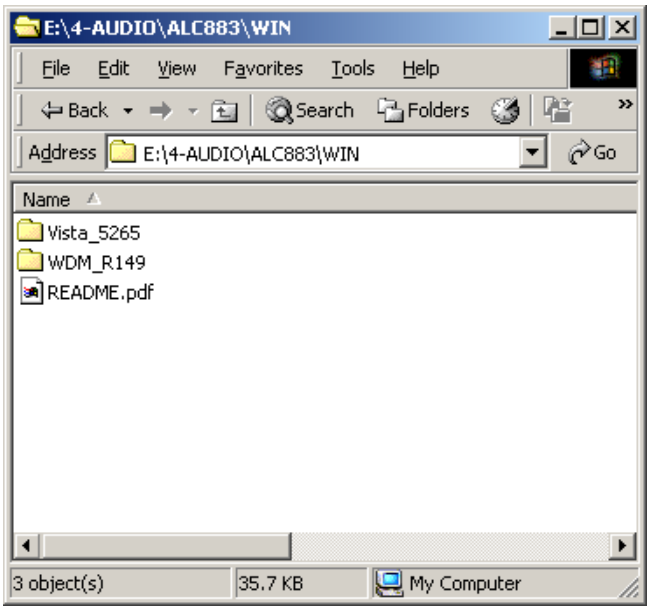

Figure 6-44: Select the OS Version

Step 6: Double-click the **Setup.exe** program icon in **Figure 6-45**.

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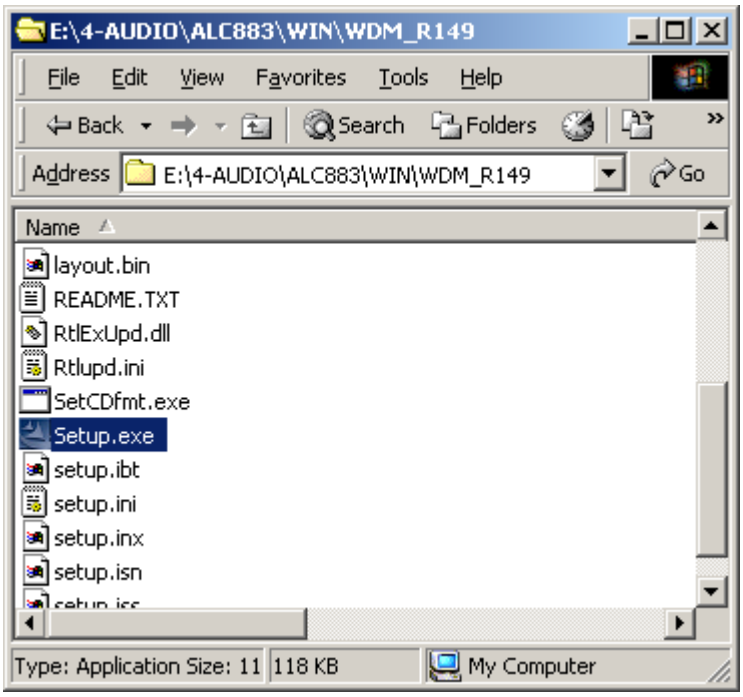

Figure 6-45: Locate the Setup Program Icon

Step 7: The **InstallShield Wizard** starts (**Figure 6-46**).

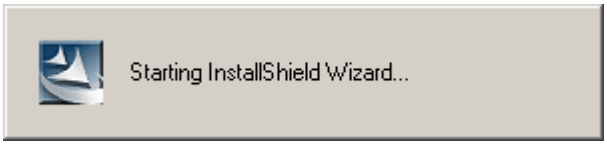

Figure 6-46: The InstallShield Wizard Starts

Step 8: The **InstallShield Wizard** is prepared to guide the user through the rest of the process (**Figure 6-47**).

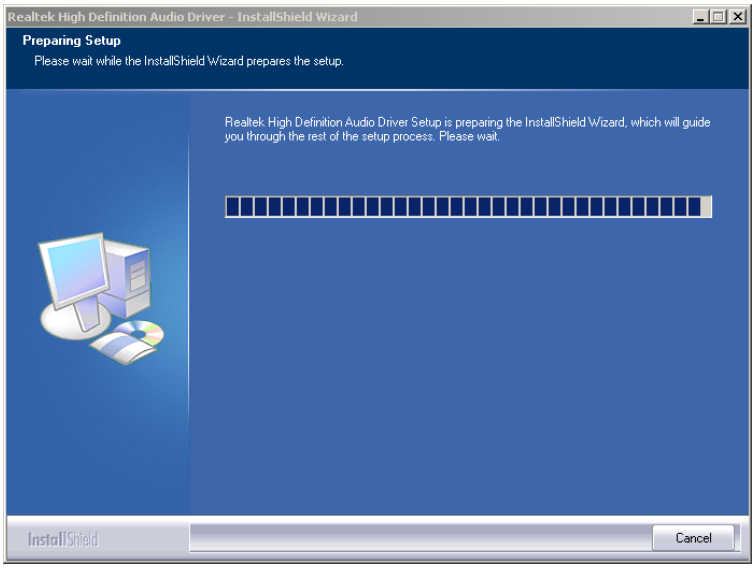
Realtek High Definition Audio Driver - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
Realtek High Definition Audio Driver Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield
Cancel

Figure 6-47: Preparing Setup Screen

Step 9: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 6-48**).

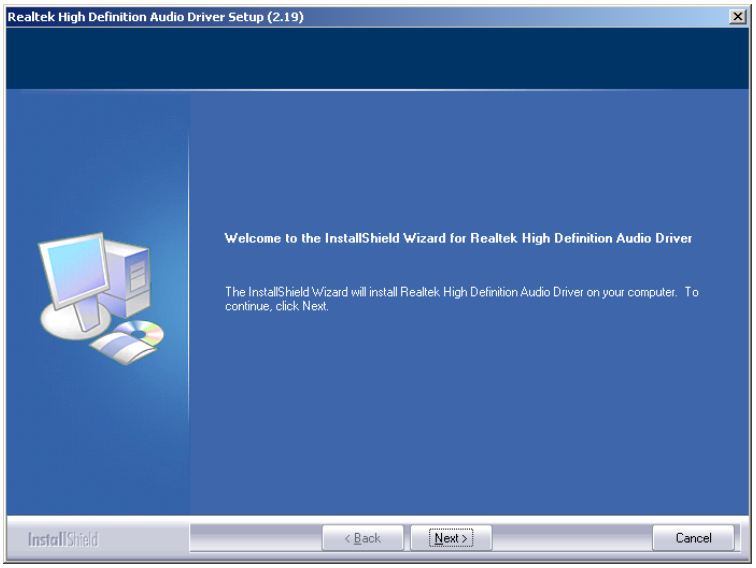
Realtek High Definition Audio Driver Setup (2.19)
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
The InstallShield Wizard will install Realtek High Definition Audio Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

Figure 6-48: InstallShield Wizard Welcome Screen

Step 10: Click **NEXT** to continue the installation.

Step 11: InstallShield starts to install the new software as shown in **Figure 6-49**.

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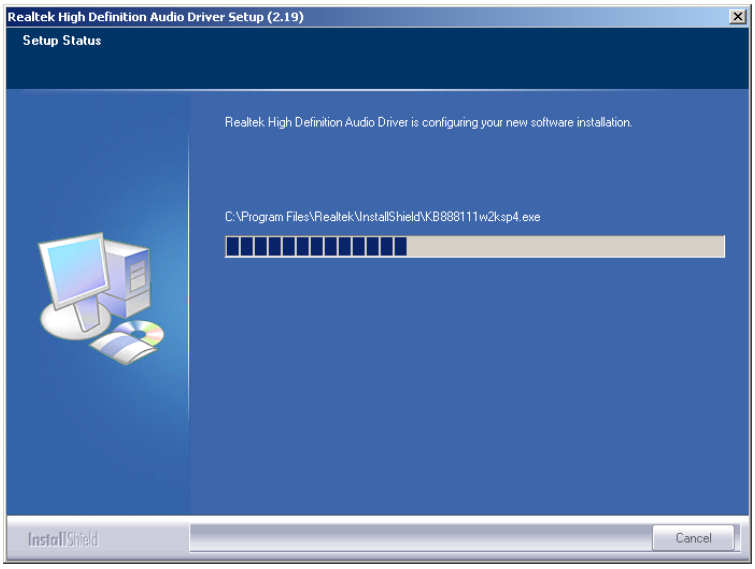
Realtek High Definition Audio Driver Setup (2.19)
Setup Status
Realtek High Definition Audio Driver is configuring your new software installation.
C:\Program Files\Realtek\InstallShield\KB888111w2ksp4.exe
InstallShield
Cancel

Figure 6-49: Audio Driver Software Configuration

Step 12: The Installation Wizard updates the system as shown in **Figure 6-50**.

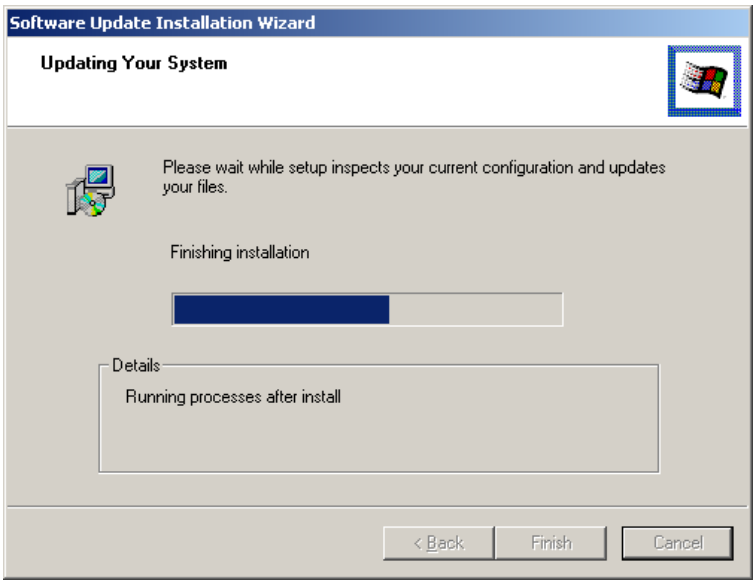

Figure 6-50: Installation Wizard Updates the System

Step 13: After the driver installation process is complete, a confirmation screen appears (**Figure 6-51**).

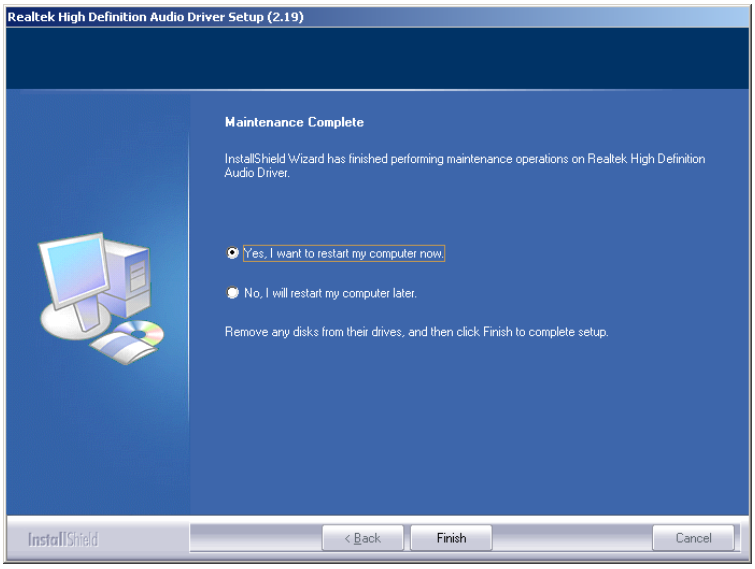
Realtek High Definition Audio Driver Setup (2.19)
Maintenance Complete
InstallShield Wizard has finished performing maintenance operations on Realtek High Definition Audio Driver.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

Figure 6-51: Restart the Computer

Step 14: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.8 Intel® Matrix Storage Manager Driver Installation

To install the Intel® Matrix Storage Manager driver, please follow the steps below:

Step 1: Select **SATA** from the list in **Figure 6-2**.

Step 2: A new window opens (**Figure 6-52**).

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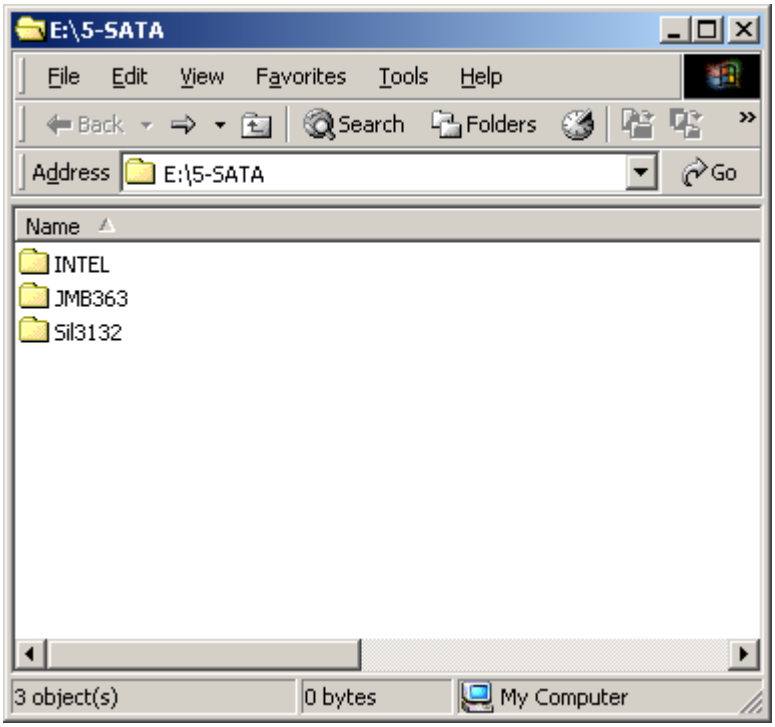

Figure 6-52: SATA RAID Driver Installation Program

Step 3: Double-click the **INTEL®** folder.

Step 4: Double-click the **iata62_cd.exe** program icon in **Figure 6-53**.

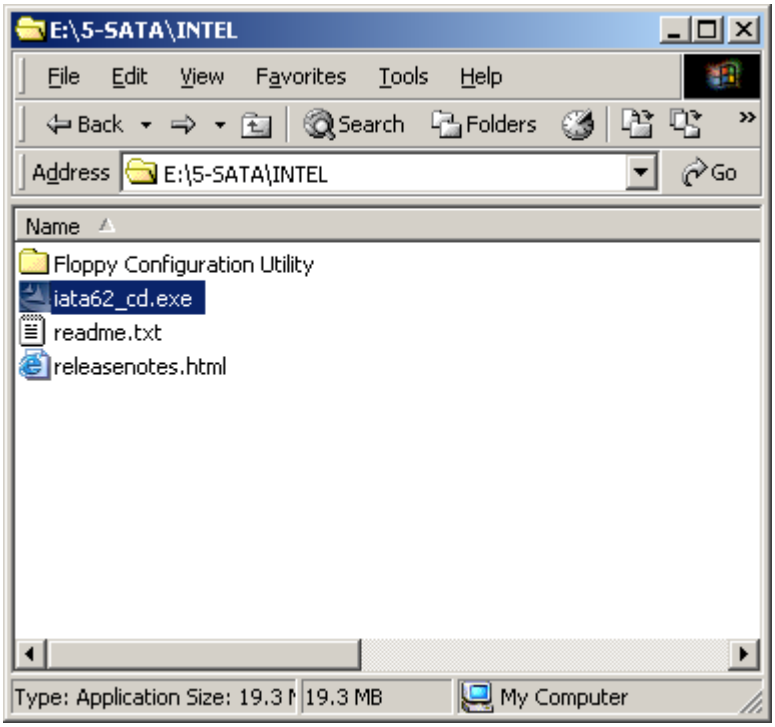

Figure 6-53: SATA RAID Setup Program Icon

Step 5: **Figure 6-54** shows the **InstallShield Wizard** preparing to guide the user through the rest of the process.

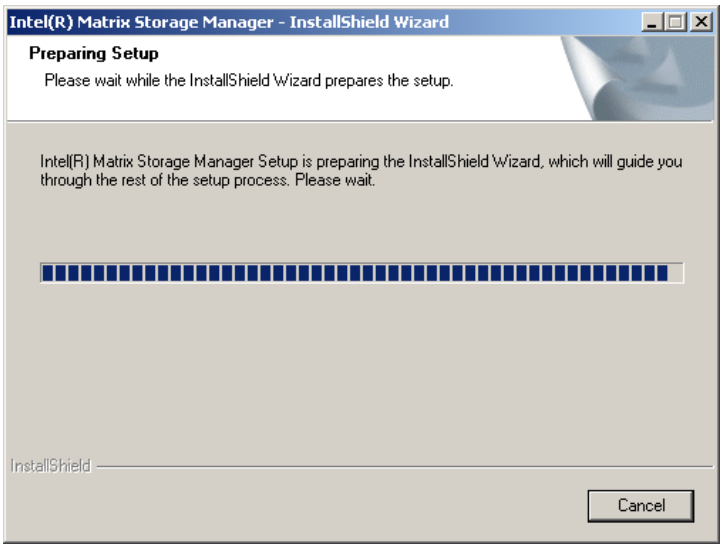
Intel(R) Matrix Storage Manager - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
Intel(R) Matrix Storage Manager Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield
Cancel

Figure 6-54: InstallShield Wizard Setup Screen

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Step 6: **Figure 6-55** shows the **Matrix Storage Manager** software configuring the installation process.

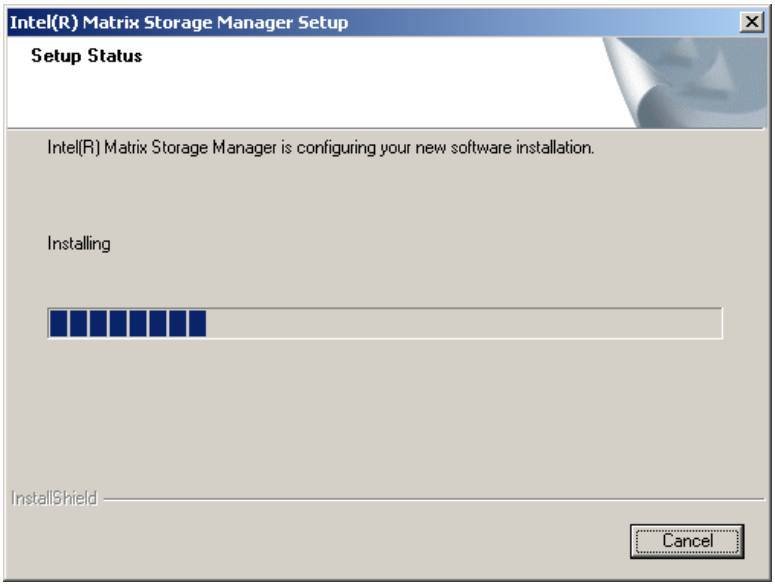

Figure 6-55: Matrix Storage Manager Setup Screen

Step 7: **Figure 6-56** shows the **Matrix Storage Manager** welcome screen.

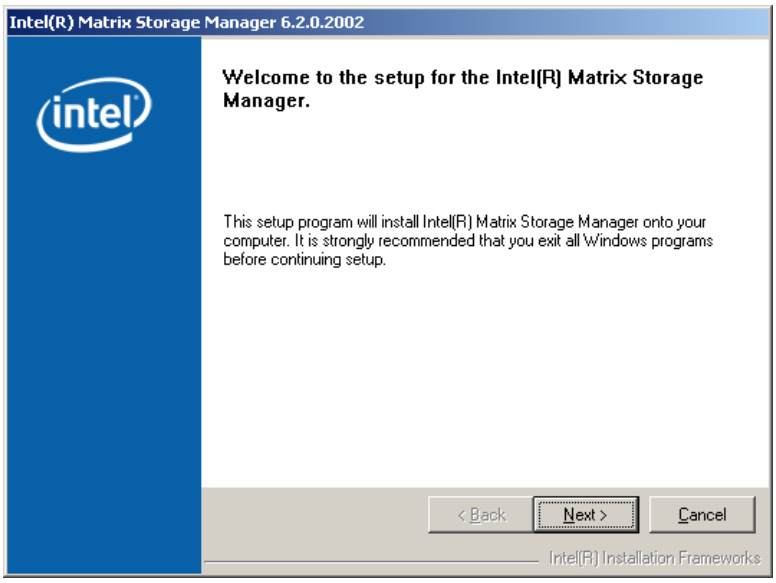
Intel(R) Matrix Storage Manager 6.2.0.2002
intel
Welcome to the setup for the Intel(R) Matrix Storage Manager.
This setup program will install Intel(R) Matrix Storage Manager onto your computer. It is strongly recommended that you exit all Windows programs before continuing setup.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 6-56: Matrix Storage Manager Welcome Screen

Step 8: Click **NEXT** and a warning appears (**Figure 6-57**). Read the warning carefully

and decide whether or not to continue the installation process.

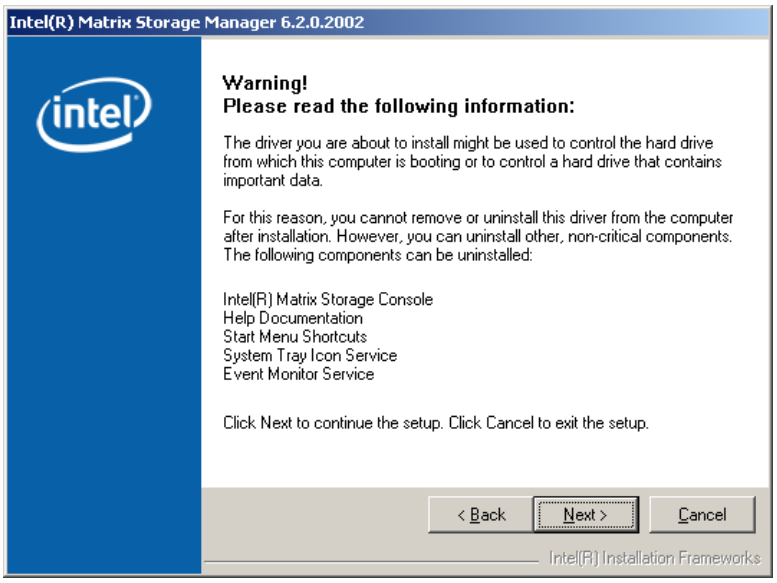
Intel(R) Matrix Storage Manager 6.2.0.2002
Warning!
Please read the following information:
The driver you are about to install might be used to control the hard drive from which this computer is booting or to control a hard drive that contains important data.
For this reason, you cannot remove or uninstall this driver from the computer after installation. However, you can uninstall other, non-critical components. The following components can be uninstalled:
Intel(R) Matrix Storage Console
Help Documentation
Start Menu Shortcuts
System Tray Icon Service
Event Monitor Service
Click Next to continue the setup. Click Cancel to exit the setup.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 6-57: Matrix Storage Manager Warning Screen

Step 9: Click **NEXT** and a license agreement appears (**Figure 6-58**).

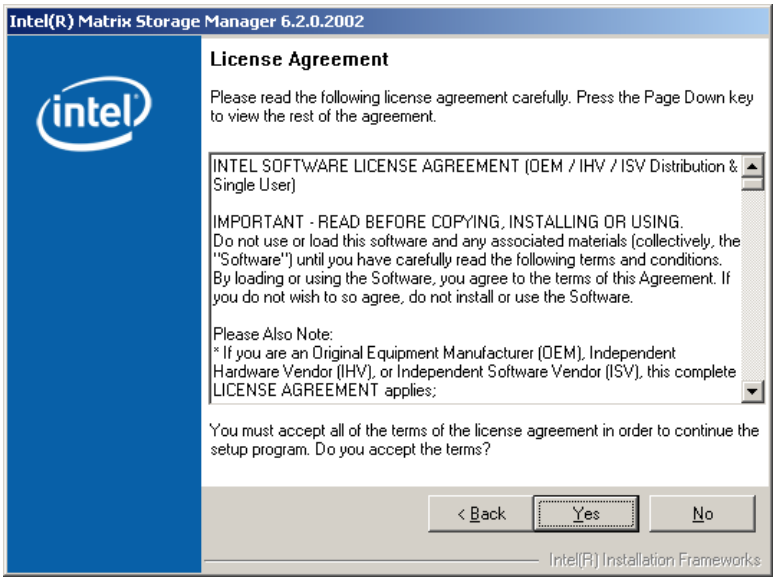
Intel(R) Matrix Storage Manager 6.2.0.2002
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 6-58: Matrix Storage Manager License Agreement

Step 10: Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the Readme information file shown in **Figure 6-59** appears.

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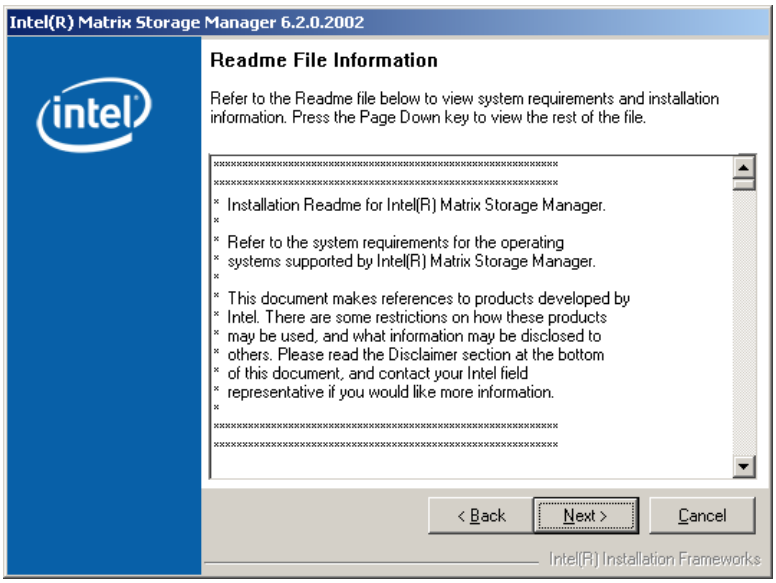
Intel(R) Matrix Storage Manager 6.2.0.2002
Readme File Information
Refer to the Readme file below to view system requirements and installation information. Press the Page Down key to view the rest of the file.
* Installation Readme for Intel(R) Matrix Storage Manager.
* Refer to the system requirements for the operating
* systems supported by Intel(R) Matrix Storage Manager.
* This document makes references to products developed by
* Intel. There are some restrictions on how these products
* may be used, and what information may be disclosed to
* others. Please read the Disclaimer section at the bottom
* of this document, and contact your Intel field
* representative if you would like more information.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 6-59: Matrix Storage Manager Readme File

Step 11: Read the Readme file information and click **NEXT**.

Step 12: After the driver installation process is complete, a confirmation screen appears (**Figure 6-60**).

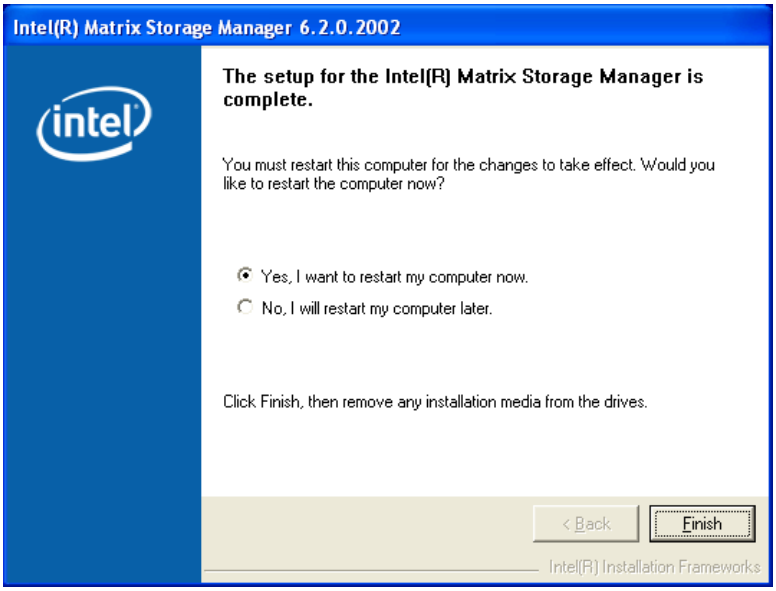
Intel(R) Matrix Storage Manager 6.2.0.2002
The setup for the Intel(R) Matrix Storage Manager is complete.
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart my computer now.
No, I will restart my computer later.
Click Finish, then remove any installation media from the drives.
< Back
Finish
Intel(R) Installation Frameworks

Figure 6-60: Matrix Storage Manager Setup Complete

Step 13: The confirmation screen offers the option of restarting the computer now or later.

For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.9 Intel® Active Management Technology Driver Installation

To install the Intel® Active Management Technology (IAMT) driver, please follow the steps below:

Step 1: Select **iAMT and Utilities** from the list in **Figure 6-2**.

Step 2: The screen in **Figure 6-61** appears.

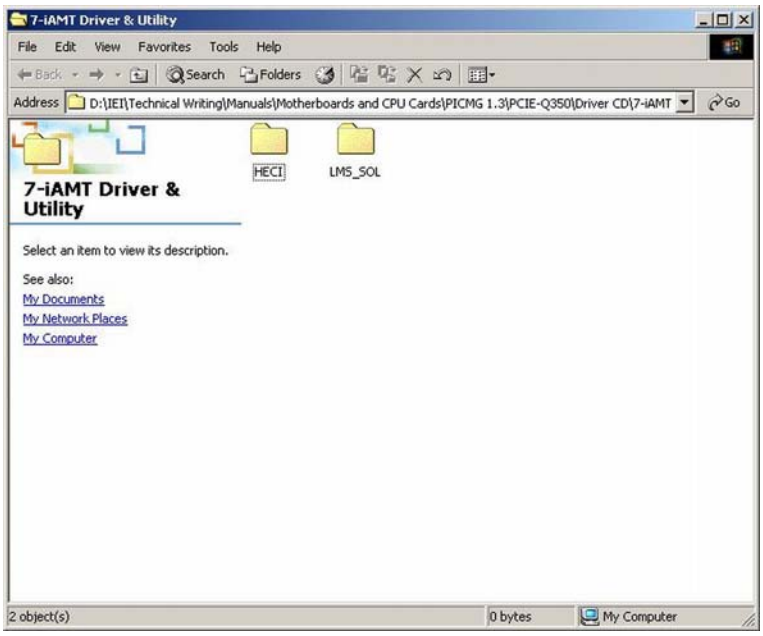

Figure 6-61: IAMT Driver Directory

Step 3: Click on the LMS_SOL directory icon. The window in **Figure 6-62** appears.

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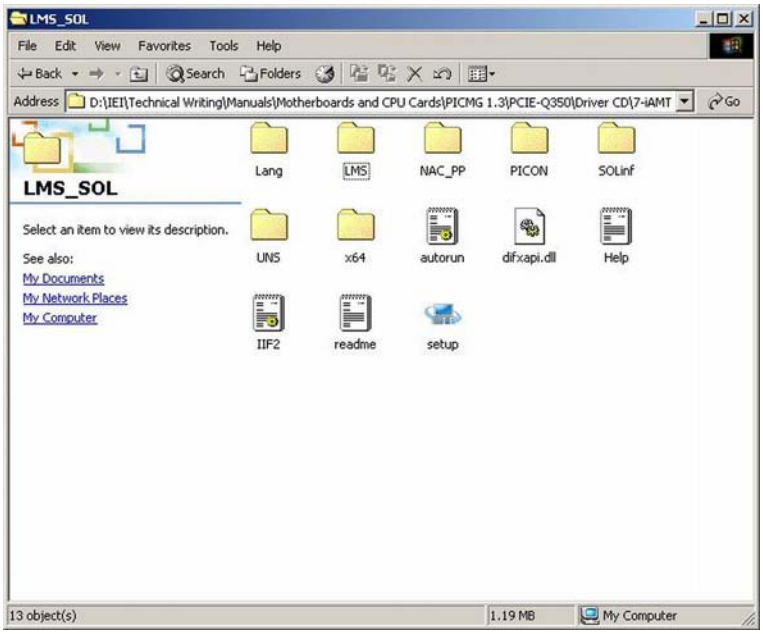

Figure 6-62: IAMT Driver Installation Icon

Step 4: Double click the setup icon in **Figure 6-62**.

Step 5: The window in **Figure 6-63** appears.

Intel® Active Management Technology
Intel® Active Management Technology
intel
Welcome to the Setup Program
This setup program will install Intel® Active Management Technology onto this computer. It is strongly recommended that you exit all programs before continuing.
Click Next to continue.
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-63: IAMT Welcome Screen

Step 6: Click **NEXT** to continue. The **License Agreement** in **Figure 6-64** appears.

Intel® Active Management Technology
Intel® Active Management Technology
License Agreement
intel
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
< Back
Yes
No
Intel® Installation Framework

Figure 6-64: IAMT License Agreement

Step 7: Agree to the terms and conditions in the license agreement by clicking **YES**.

Step 8: The **IAMT Readme** file in **Figure 6-65** appears

Intel® Active Management Technology
Intel® Active Management Technology
Readme File Information
intel
Refer to the Readme file below to view the system requirements and installation information.
****
* Copyright 2006, 2007 Intel Corporation
* Intel(R) Active Management Technology Local Manageability Service
* Serial Over LAN
****
Intel(R) Active Management Technology Local Management Service Allows applications to access the local
< Back
Next >
Cancel
Intel® Installation Framework

Figure 6-65: IAMT Readme File

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Step 9: Click **NEXT** to continue.

Step 10: Setup operations are performed. See **Figure 6-66**.

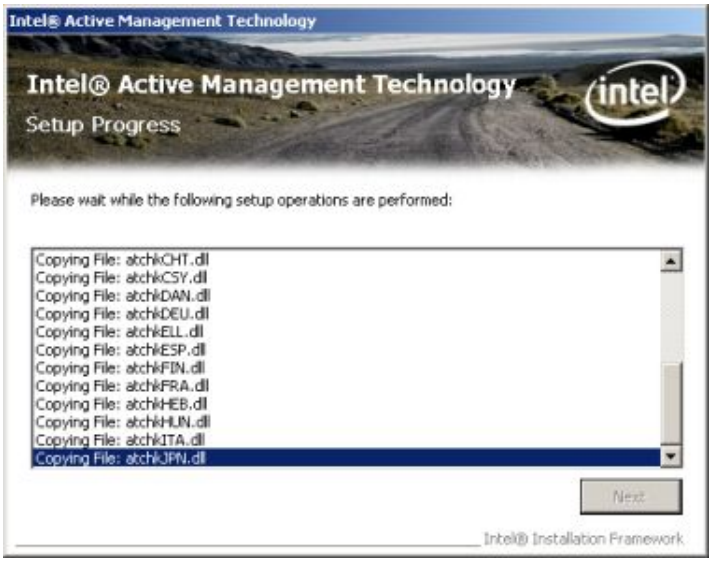

Figure 6-66: IAMT Setup Operations

Step 11: When the Setup Operations in **Figure 6-66** are complete, the window in **Figure 6-67** appears.

Intel® Active Management Technology
Intel® Active Management Technology
Setup Is Complete
The setup program successfully installed Intel® Active Management Technology onto this computer. Click Finish to complete the setup process.
Finish
Intel® Installation Framework

Figure 6-67: Completed Installation

Step 12: Click **FINISH** to complete the IAMT installation.

Step 13: Go back to **iAMT and Utilities** directory (**Figure 6-68**).

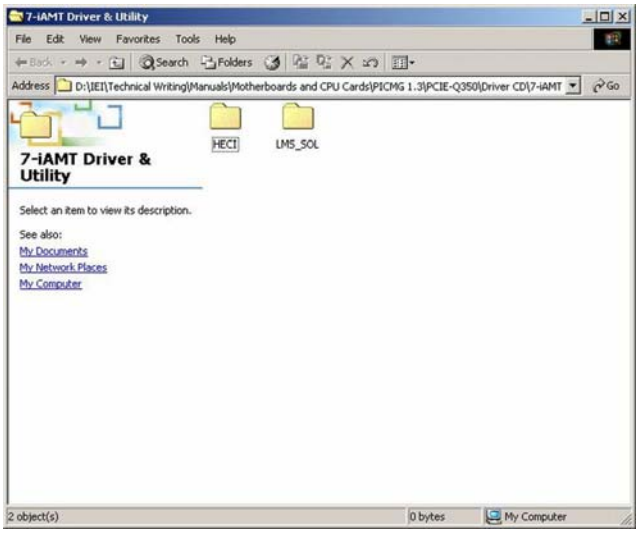

Figure 6-68: IAMT Driver Directory

Step 14: Click on the HECI directory icon. The window in **Figure 6-69** appears.

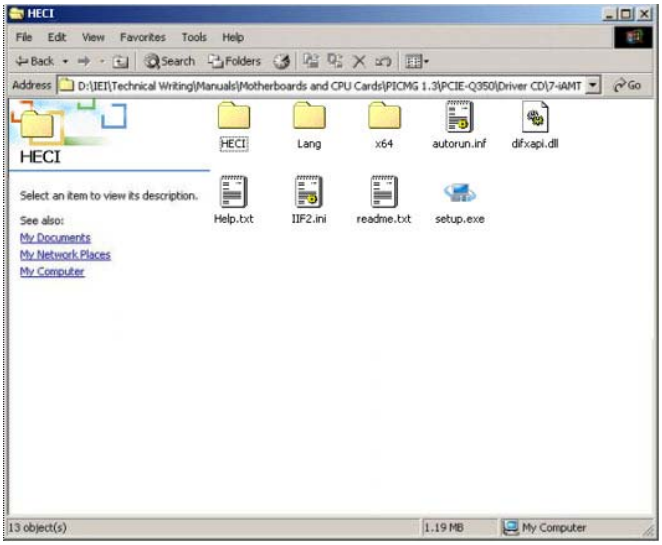

Figure 6-69: HECI Driver Installation Icon

Step 15: Double click the setup icon in **Figure 6-69**.

Step 16: Follow the step-by-step installation process to install the HECI driver.

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Chapter

8

Intel® AMT Configuration

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8.1 Intel® AMT Setup Procedure

The MMGA is featured with the Intel® Active Management Technology (AMT) 3.0. To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure the **DIMM1** socket is installed with one DDR2 DIMM.

Step 2: Connect an Ethernet cable to the RJ-45 connector labeled **LAN2_USB23**.

Step 3: The AMI BIOS options regarding the Intel® ME or Intel® AMT must be enabled, including:

- Intel® AMT Configuration [Advanced] (see **Section 6.3.8**)
- ME Subsystem Configuration [Advanced] (see **Section 6.3.8.1**)

Step 4: Configure the Intel® Management Engine BIOS extension (MEBx) (see **Section 8.2** below)

Step 5: Properly install the Intel® AMT drives. Make sure to install both HECI and LMS_SOL drivers from the iAMT Driver & Utility directory in the driver CD (see **Section 7.9**).

Step 6: The following dialog window is displayed after the OS is loaded to show the Intel® AMT status on the MMGA is enabled.

Intel® Active Management Technology Status
Intel® Active Management Technology (Intel® AMT) status on this computer is: enabled.
To enable or disable Intel® AMT, contact your authorized system administrator.
For more information about Intel® AMT, click here.
OK

Figure 8-1: Intel® Active Management Technology Status Dialog

8.2 Intel® Management Engine BIOS Extension

This section describes the essential steps for using the Intel® Management Engine BIOS extension (MEBx).

Step 1: A screen prompts the user to press <Ctrl+P> after a single beep during boot-up process. To get into the Intel® MEBx settings, press <**Ctrl+P**>.

Step 2: Enter the Intel® current ME password as it requires (**Figure 8-2**). Enter the CyberResearch factory ME password: **Abab12!@** (the Intel® default password is **admin**).

NOTE:

The default Intel® ME password is **admin**. The password has been reset to **Abab12!@** during a quality control process. After clearing the CMOS, the ME password bound to Intel® default password (admin). Use the Intel® default password to enter the Intel® ME BIOS and change the password (refer to **Step 3** below) to be able to configure the Intel® AMT and ME options.

Figure 8-2: Intel® Current ME Password

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Step 3: To change the password, select **Change Intel® ME Password**. Enter a new password following the strong password rule (containing at least one upper case letter, one lower case letter, one digit and one special character, and be at least eight characters). (**Figure 8-3**)

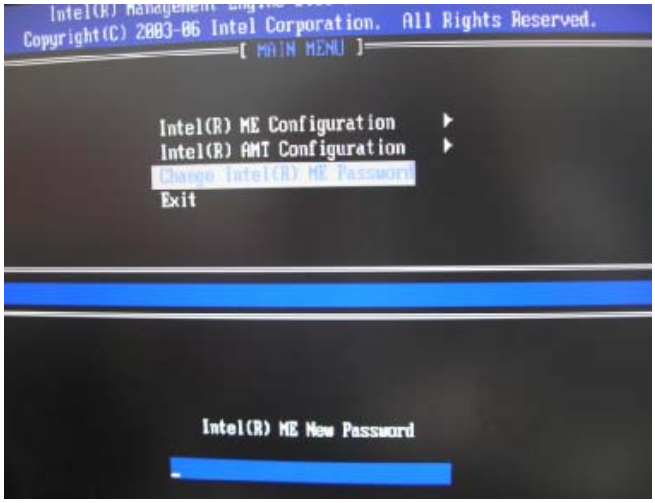

Figure 8-3: Change Intel® ME Password

Step 4: Verify the new password by entering again (**Figure 8-4**).

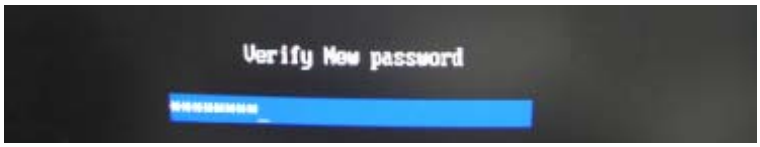

Figure 8-4: Verify New Password

Step 5: Select **Intel® AMT Configuration** and press **Enter** (**Figure 8-5**).

Figure 8-5: Intel® AMT Configuration

Step 6: Select **Provision Model** and press **Enter**. (**Figure 8-6**)

Figure 8-6: Provision Model

Step 7: When the screen in **Figure 8-7** prompts, enter **N** and press **Enter**.

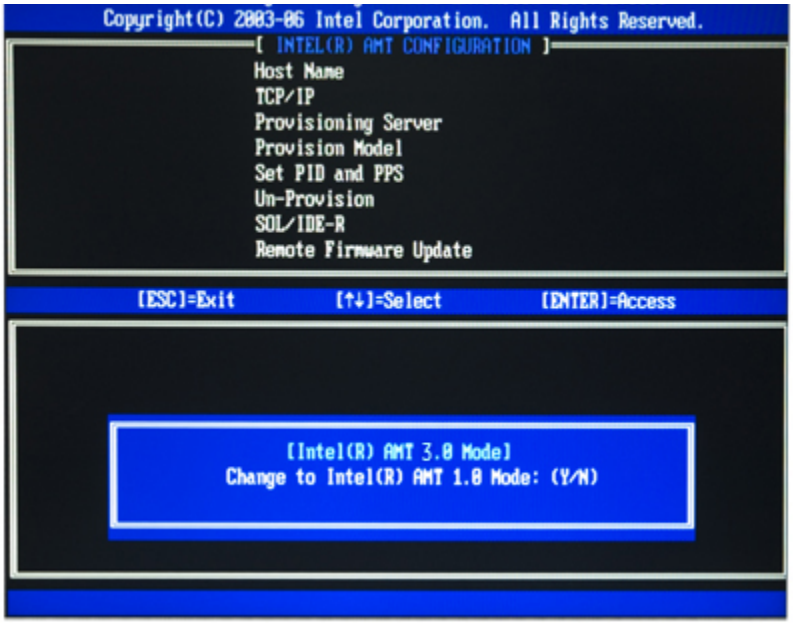

Figure 8-7: Intel® AMT 3.0 Mode

Step 8: A message prompts to confirm to Change to Small Business (**Figure 8-8**). Enter **Y** and press **Enter**.

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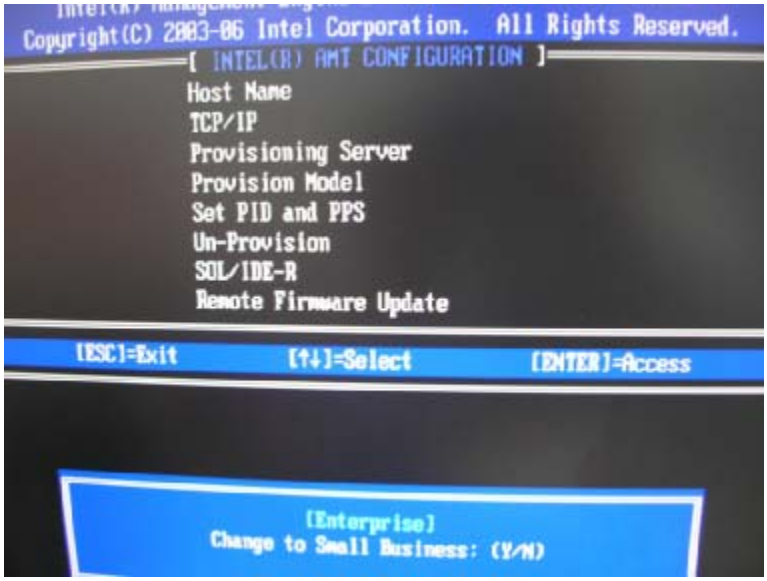

Figure 8-8: Enterprise

Step 9: Select TCP/IP (in Intel AMT Configuration) and press **Enter**. A message prompts for disabling network interface. Enter **N** to enable network interface.

Figure 8-9: Enable Network Interface

Step 10: Enable or disable DHCP. DHCP is enabled by default. If DHCP is disabled, enter the following TCP/IP settings:

- Static TCP/IP address (the static TCP/IP address and Intel® AMI Host Name must be different from those configured in the operating system)
- Subnet mask
- Default Gateway address (optional)
- Preferred Domain Naming Services (DNS) serer address (optional)
- Alternate DNS server address (optional)
- Domain name (optional)

Step 11: Make other necessary settings in the Intel® MEBx depending on users' need.

Step 12: To exit the Intel® MEBx, return to the main menu and select **Exit**. (**Figure 8-10**)

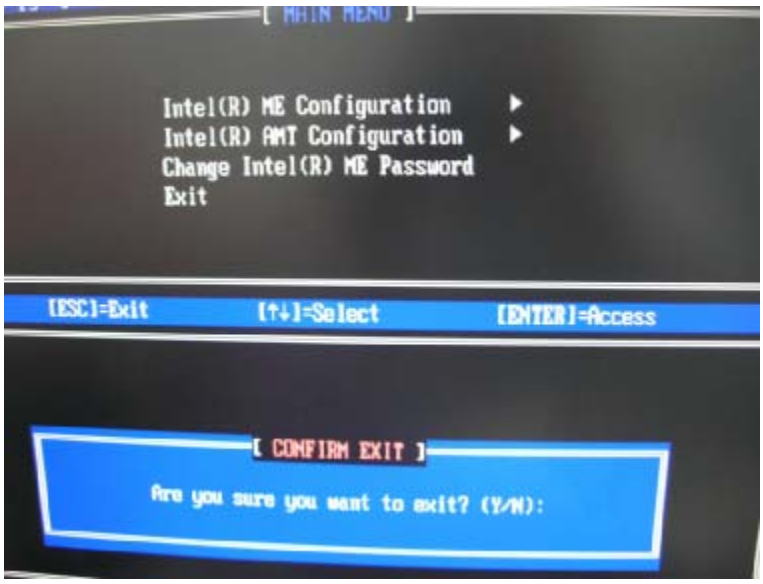

Figure 8-10: Exit

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8.3 Using the Intel® AMT Web Interface

NOTE:

Prior to use the Intel® AMT web interface, please make sure the Intel® AMT drivers are properly installed in the MMGA and the Intel® AMT enabled confirmation dialog window displays after boot-up.

To access an Intel® AMT client system from a remote console, follow the steps below.

Step 1: Obtain the IP address of the client system.

Step 2: On the remote management console, open a web browser.

Step 3: If DHCP is enabled in the TCP/IP menu of the Intel® ME BIOS (**Section 8.2**, **Step 10**), get the client system IP address in the MS DOS. Enter the client system IP address and the port number in the web browser:

http://*ip_address*:16992 Example: http://192.168.1.7:16992 (**Figure 8-11**)

Or simply enter the defined host name: http://*host_name*:16992

Example: http://AMTsystem:16992

Figure 8-11: Intel® AMT Web Address

Step 4: If a static IP address is defined for the Intel® AMT client system, enter the defined client system IP address and the port number in the web browser.

Step 5: A login window prompts (**Figure 8-12**).

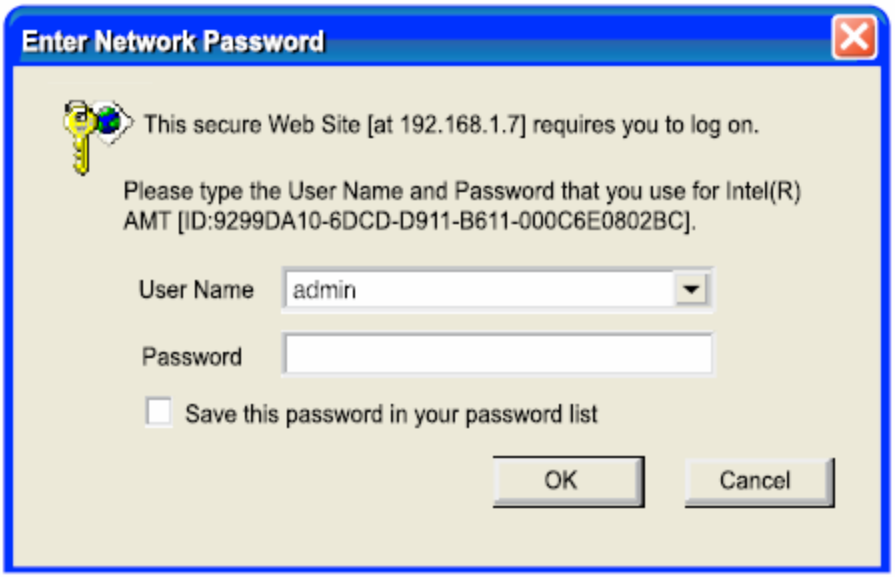
Enter Network Password
This secure Web Site [at 192.168.1.7] requires you to log on.
Please type the User Name and Password that you use for Intel(R) AMT [ID:9299DA10-6DCD-D911-B611-000C6E0802BC].
User Name
admin
Password
Save this password in your password list
OK
Cancel

Figure 8-12: Intel® AMT Web Login Dialog

Step 6: Enter **admin** as the user name (**Figure 8-12**).

Step 7: Enter the password changed in the Intel® MEBx configuration (**Section 8.2**), if the password remained as default, enter Abab12!@

Step 8: Press **OK** and the Intel® AMT web interface appears (**Figure 8-13**).

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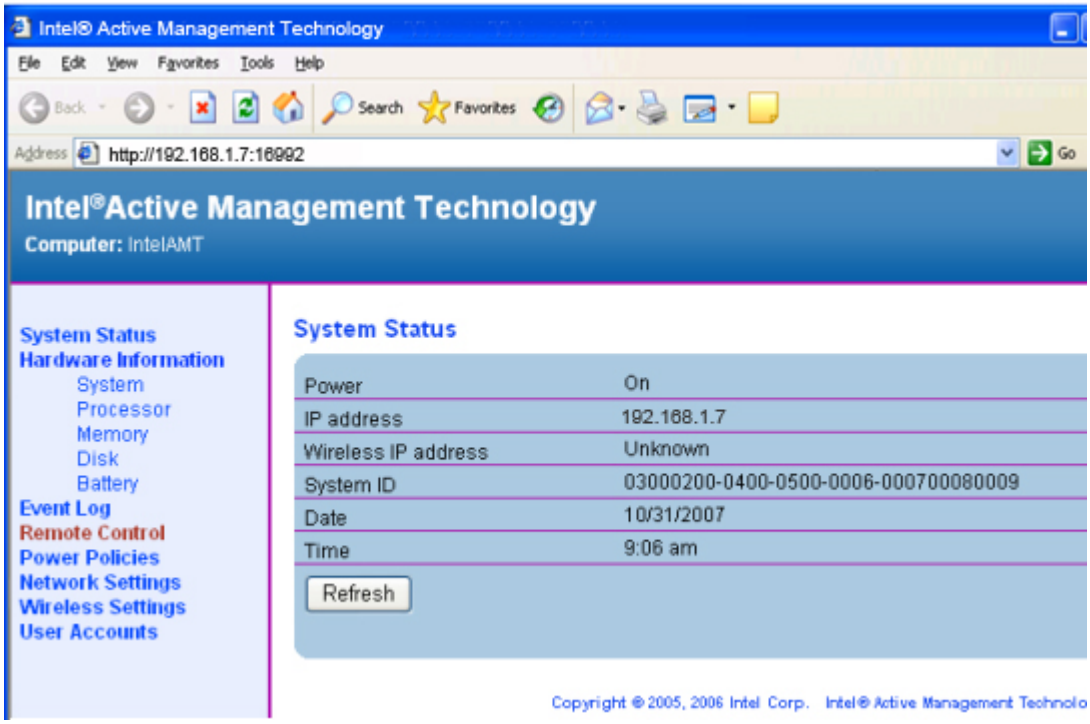

Figure 8-13: Intel® AMT Web Interface

NOTE:

To enhance the platform manageability of the MMGA, work with the Independent Software Vendors (ISV) to implement the Intel® AMT management utility on the system.

Appendix

A

BIOS Options

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www.cyberresearch.com

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Appendix

B

Terminology

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ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude (“volume”) of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising

	and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Ouput Controll Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.

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L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
MAC	The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.
PCIe	PCI Express (PCIe) is a communications bus that uses dual data lines for full-duplex (two-way) serial (point-to-point) communications between the SBC components and/or expansion cards and the SBC chipsets. Each line has a 2.5 Gbps data transmission rate and a 250 MBps sustained data transfer rate.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAID	Redundant Array of Inexpensive Disks (RAID) refers to redundantly backing up data on multiple disks to ensure that if one disk fails, the data is not lost and can be restored from the remaining disks in the array.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.

UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates, while USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

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Appendix

C

DIO Interface

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C.1 DIO Interface Introduction

The DIO connector on the MMGA is interfaced to GPIO ports on the ITE IT8712F Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the ITE IT8712F Super I/O chipset.

C.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 3	GP27	General purpose I/O port 2 bit 7.
4	Output 2	GP26	General purpose I/O port 2 bit 6.
5	Output 1	GP25	General purpose I/O port 2 bit 5.
6	Output 0	GP24	General purpose I/O port 2 bit 4.
7	Input 3	GP23	General purpose I/O port 2 bit 3.
8	Input 2	GP22	General purpose I/O port 2 bit 2
9	Input 1	GP21	General purpose I/O port 2 bit 1
10	Input 0	GP20	General purpose I/O port 2 bit 0

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

```
MOV     AX, 6F08H     Sets the digital port as input
INT     15H           Initiates the INT 15H BIOS call
```

C.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

```
MOV     AX, 6F09H     Sets the digital port as output
MOV     BL, 09H
INT     15H           Initiates the INT 15H BIOS call
```


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Appendix

D

Watchdog Timer

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NOTE:

The following discussion applies to DOS environment. Contact CyberResearch support or visit the CyberResearch website visited for specific drivers for more sophisticated operating systems like Microsoft Windows.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table D-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

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NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30                  ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1             ;is the application over?
        JNE       W_LOOP        ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT      15H
;
; EXIT ;
```

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Appendix

E

Address Mapping

E.1 Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel® Graphics Controller
3C0-3DF	Intel® Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1

Table E-1: IO Address Map

E.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table E-2: 1st MB Memory Address Map

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E.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table E-3: IRQ Mapping Table

E.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table E-4: IRQ Mapping Table

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Appendix

F

Compatibility

NOTE:

The compatible items described here have been tested by the manufacturer and were found to be compatible with the MMGA.

F.1 Compatible Operating Systems

The following operating systems have been successfully run on the MMGA.

- Microsoft Windows XP (SP2)
- Fedora Core 7

F.2 Compatible Processors

The following Intel® LGA775 processors have been successfully tested on the MMGA.

CPU	Model Number	Frequency	FSB
65nm Intel® Core™ 2 Duo	E6850	3.0 GHz	1333 MHz
65nm Intel® Core™ 2 Duo	E6750	2.66 GHz	1333 MHz

F.3 Compatible Memory Modules

NOTE:

The memory modules listed below have been tested on the MMGA other memory modules that comply with the specifications may also work on the MMGA but have not been tested.

The following memory modules have been successfully tested on the MMGA.

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Manufacturer	Model No.	Capacity	Speed
Twinmos	8D25JK-TT	512 MB	800 MHz
UMAX	RMUMX-512DDR667C	512 MB	667 MHz

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Appendix

G

Intel® Matrix Storage Manager

G.1 Introduction

The Intel® ICH9DO chipset can provide data protection for serial ATA (SATA) disks via the Intel® Matrix Storage Manager using one of three fault-tolerant RAID levels: RAID 1, 5 or 10. When using two hard drives, matrix RAID allows RAID 0 and RAID 1 functions to be combined, where critical files can be stored on RAID 1, and RAID 0 can be used for non-critical items such as software. RAID 5 and RAID 0 can be combined to provide higher performance, capacity, and fault tolerance.

CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

G.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

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CAUTION!

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

G.2 Features and Benefits

- Supports RAID levels 0, 1, 5 and 10
- Supports connectivity to two or more disk drives
- Supported Operating Systems include: Windows XP, Windows Server 2003 and Windows Vista

G.3 Accessing the Intel® Matrix Storage Manager

To access the Intel® Matrix Storage Manager, please follow the steps below.

Step 1: **Connect SATA drives to the system**. Connect two or more SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration. If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: **Enable SATA drives in BIOS**. Start the computer and access the **BIOS** setup program. Enable **SATA** support for all IDE devices. Refer to the applicable BIOS configuration section in this user manual.

Step 3: **Save and Exit BIOS**. After the **SATA** support option is enabled, save and exit the **BIOS**.

Step 4: **Reboot the system**. Reboot the system after saving and exiting the **BIOS**.

Step 5: **Press Ctrl+I**. During the system boot process, press **Ctrl+I** when prompted to enter the RAID configuration software.

Step 6: **Configure the RAID settings**. Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

Step 7: **Install the OS**. After the RAID array has been configured, install the OS. To do this, please refer to the documentation that came with the OS.

G.4 RAID Configuration

G.4.1 Creating a RAID Volume

WARNING!

All data previously stored on the member drives of a RAID configuration are destroyed during the RAID initialization process. If “used” drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: **Select** “**Create RAID Volume**”. Use the arrow keys to highlight **Create RAID Volume** and press **ENTER**. See **Figure G-1**.

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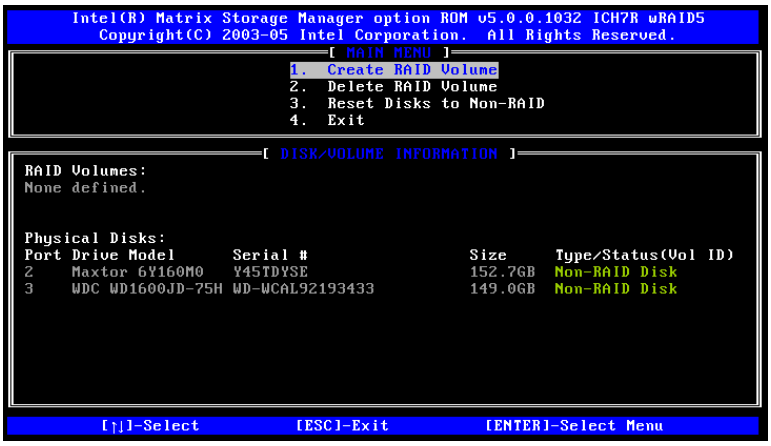
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
None defined.
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Non-RAID Disk
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Non-RAID Disk
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-1: Matrix Storage Manager Main Menu

Step 2: **Name the RAID volume**. Enter a name for the RAID volume, or press **ENTER** to accept the default volume name. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array. See **Figure G-2**.

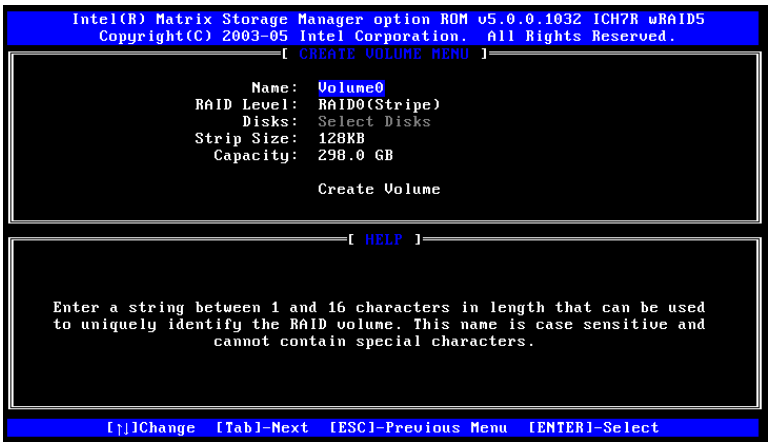
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 298.0 GB
Create Volume
[HELP]
Enter a string between 1 and 16 characters in length that can be used to uniquely identify the RAID volume. This name is case sensitive and cannot contain special characters.
[↑↓]Change [Tab]-Next [ESC]-Previous Menu [ENTER]-Select

Figure G-2: Create RAID Volume Name

Step 3: **Choose the RAID level**. Select a RAID level from the list. RAID levels include RAID 0, 1, 5 and 10. See **Figure G-3**.

NOTE:

RAID 0 and RAID1 levels require a minimum of two hard drives.

RAID5 level requires a minimum of three hard drives.

RAID10 level requires a minimum of four hard drives.

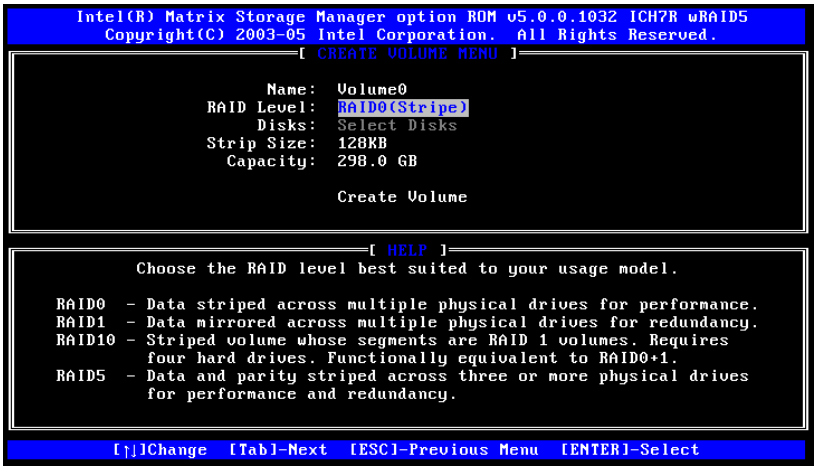
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 298.0 GB
Create Volume
[HELP]
Choose the RAID level best suited to your usage model.
RAID0 - Data striped across multiple physical drives for performance.
RAID1 - Data mirrored across multiple physical drives for redundancy.
RAID10 - Striped volume whose segments are RAID 1 volumes. Requires four hard drives. Functionally equivalent to RAID0+1.
RAID5 - Data and parity striped across three or more physical drives for performance and redundancy.
[↑↓]Change [Tab]-Next [ESC]-Previous Menu [ENTER]-Select

Figure G-3: Choose the Raid Level

Step 4: **Select the Stripe Size**. Select a stripe size from the list. See **Figure G-4**.

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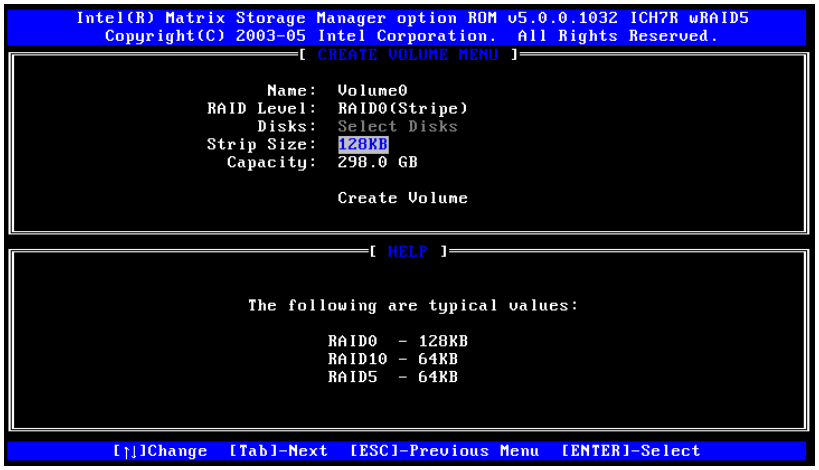

Figure G-4: Select the Stripe Size

Step 5: **Enter the Volume Capacity**. Enter the volume capacity, or press **ENTER** to accept the default capacity. See **Figure G-5**.

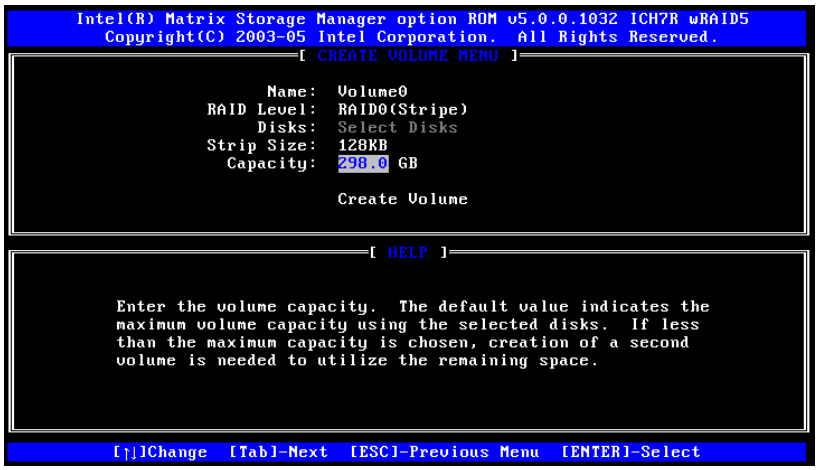
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 298.0 GB
Create Volume
[HELP]
Enter the volume capacity. The default value indicates the maximum volume capacity using the selected disks. If less than the maximum capacity is chosen, creation of a second volume is needed to utilize the remaining space.
[↑↓]Change [Tab]-Next [ESC]-Previous Menu [ENTER]-Select

Figure G-5: Enter the Volume Capacity

Step 6: **Create the RAID Volume**. Press **ENTER** to create the RAID volume as specified. See **Figure G-6**.

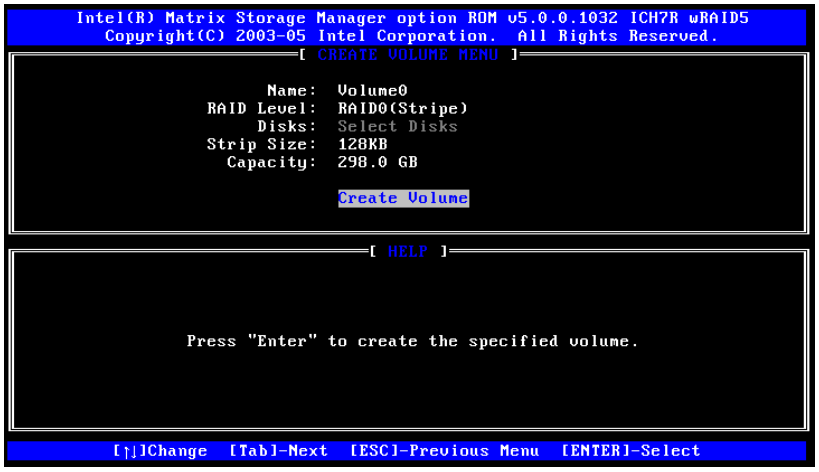
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 298.0 GB
Create Volume
[HELP]
Press "Enter" to create the specified volume.
[↑↓]Change [Tab]-Next [ESC]-Previous Menu [ENTER]-Select

Figure G-6: Create the RAID Volume

Step 7: **Create RAID Volume Verification**. After reading the warning, press **Y** to create the RAID volume as specified, or **N** to return to the **Create RAID Volume** menu. See **Figure G-7**.

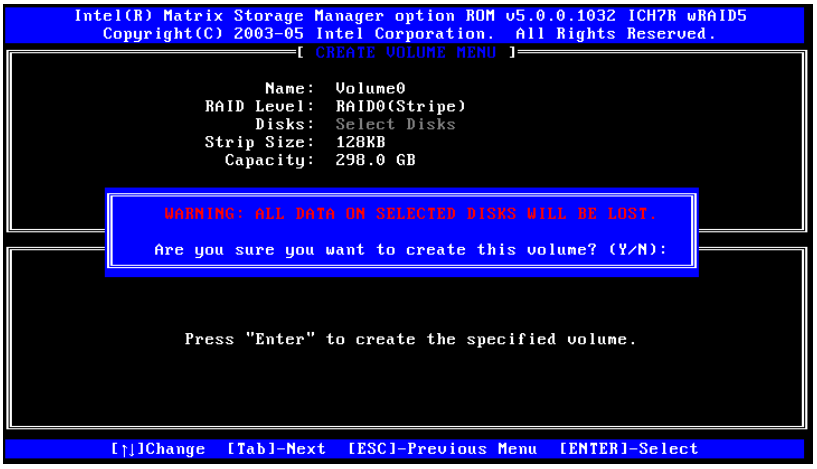
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[CREATE VOLUME MENU]
Name: Volume0
RAID Level: RAID0(Stripe)
Disks: Select Disks
Strip Size: 128KB
Capacity: 298.0 GB
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N):
Press "Enter" to create the specified volume.
[↑↓]Change [Tab]-Next [ESC]-Previous Menu [ENTER]-Select

Figure G-7: Create RAID Volume Verification

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G.4.2 Deleting a RAID Volume

WARNING!

All data stored on the member drives of a RAID volume are destroyed during the RAID deletion process. Make sure any data to be saved has been moved or backed up before deleting a RAID volume.

Step 1: **Select** "**Delete RAID Volume**." Use the arrow keys to highlight **Delete RAID Volume** and press **ENTER**. See **Figure G-8**.

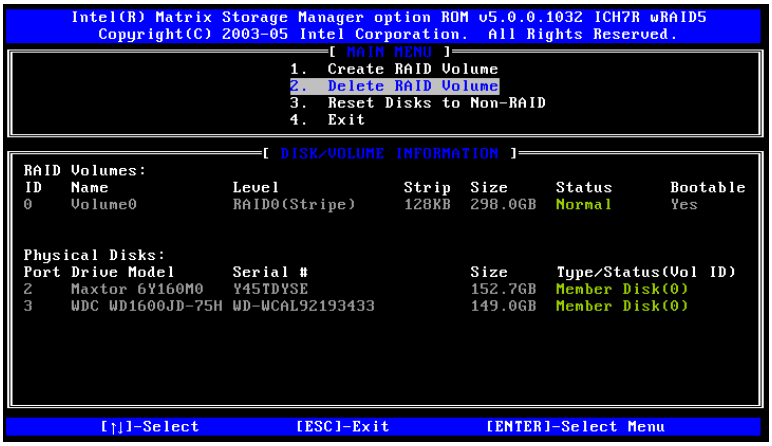
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID0(Stripe) 128KB 298.0GB Normal Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Member Disk(0)
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk(0)
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-8: Delete RAID Volume Menu

Step 2: **Select RAID Volume to be Deleted**. Use the arrow keys to highlight the RAID volume to be deleted and press **ENTER**. See **Figure G-9**.

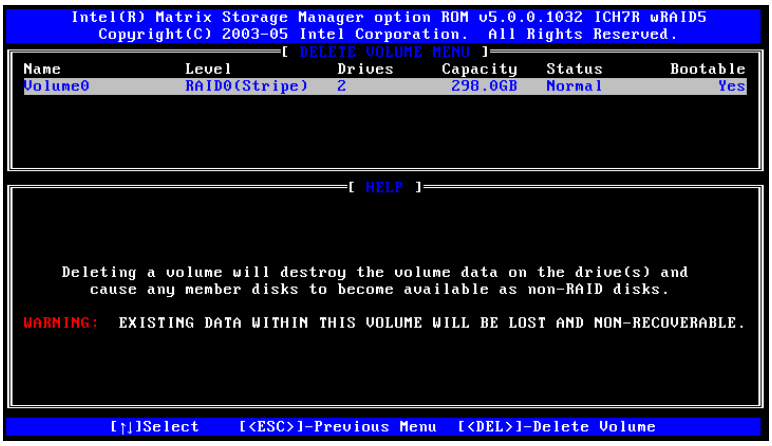
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[DELETE VOLUME MENU]
Name Level Drives Capacity Status Bootable
Volume0 RAID0(Stripe) 2 298.0GB Normal Yes
[HELP]
Deleting a volume will destroy the volume data on the drive(s) and cause any member disks to become available as non-RAID disks.
WARNING: EXISTING DATA WITHIN THIS VOLUME WILL BE LOST AND NON-RECOVERABLE.
[↑↓]Select [<ESC>]-Previous Menu [<DEL>]-Delete Volume

Figure G-9: Select RAID Volume to be Deleted

Step 3: **Delete Volume Verification**. After reading the warning, press **Y** to delete the specified RAID volume, or **N** to return to the **Delete Volume** menu. See **Figure G-10**.

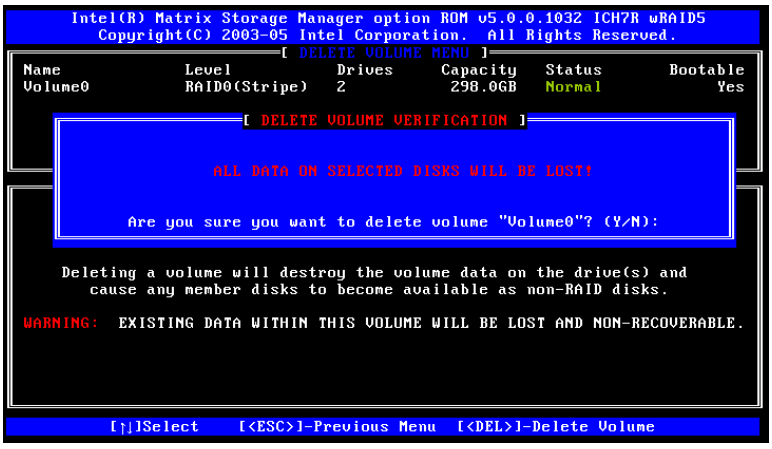
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[DELETE VOLUME MENU]
Name Level Drives Capacity Status Bootable
Volume0 RAID0(Stripe) 2 298.0GB Normal Yes
[DELETE VOLUME VERIFICATION]
ALL DATA ON SELECTED DISKS WILL BE LOST!
Are you sure you want to delete volume "Volume0"? (Y/N):
Deleting a volume will destroy the volume data on the drive(s) and cause any member disks to become available as non-RAID disks.
WARNING: EXISTING DATA WITHIN THIS VOLUME WILL BE LOST AND NON-RECOVERABLE.
[↑↓]Select [<ESC>]-Previous Menu [<DEL>]-Delete Volume

Figure G-10: Delete Volume Verification

Step 4: **Non-RAID Disks**. After deleting the RAID volume, the disks belonging to the volume will be shown as non-RAID disks. See **Figure G-11**.

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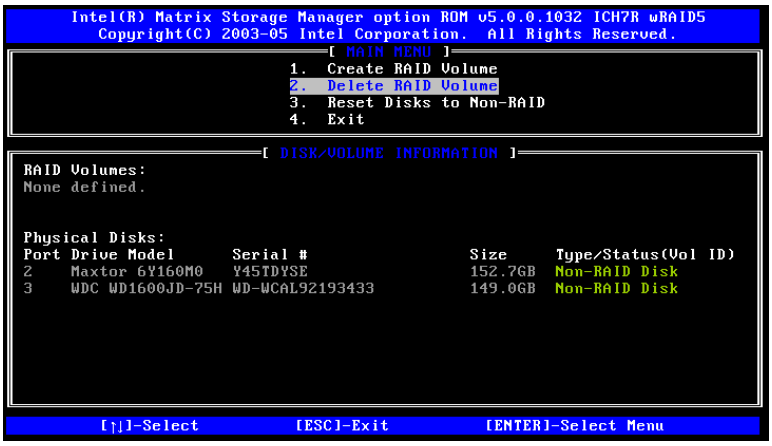
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
None defined.
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
2 Maxtor 6Y160M0 Y45TD4SE 152.7GB Non-RAID Disk
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Non-RAID Disk
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-11: Non-RAID Disks

G.4.3 Resetting a Disk to Non-RAID

WARNING!

All data stored on the disk drive of a RAID volume is destroyed when resetting it to non-RAID. Make sure any data to be saved has been moved or backed up before resetting a disk to non-RAID.

Step 1: **Select** "**Reset Disk to Non-RAID**." Use the arrow keys to highlight **Reset Disk to Non-RAID** and press **ENTER**. See **Figure G-12**.

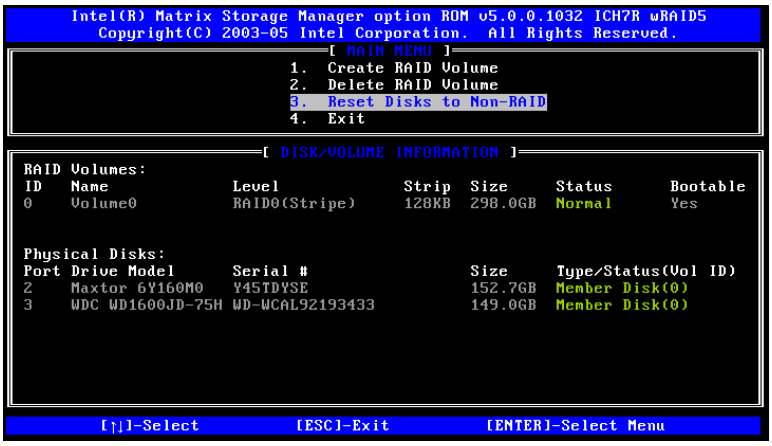
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID0(Stripe) 128KB 298.0GB Normal Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Member Disk(0)
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk(0)
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-12: Reset Disk to Non-RAID Menu

Step 2: **Select Disks to Reset**. Use the arrow keys to scroll through the disk drives and press **SPACE** to select which drives are to be reset as non-RAID. After all the disks to be reset have been chosen, press **ENTER**. See **Figure G-13**.

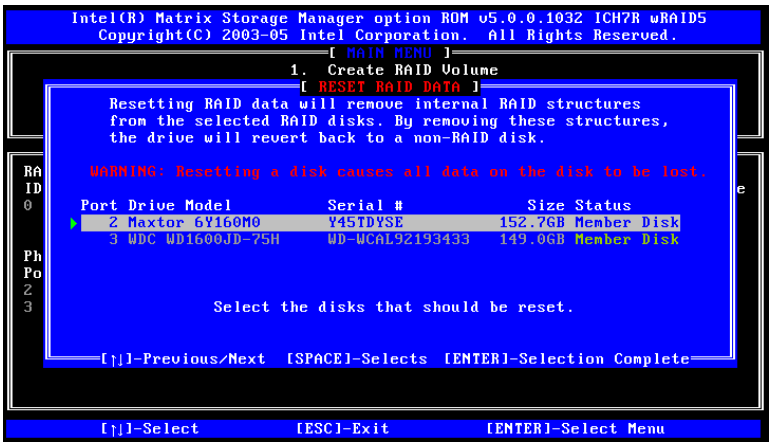
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
[RESET RAID DATA]
Resetting RAID data will remove internal RAID structures
from the selected RAID disks. By removing these structures,
the drive will revert back to a non-RAID disk.
WARNING: Resetting a disk causes all data on the disk to be lost.
Port Drive Model Serial # Size Status
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Member Disk
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk
Select the disks that should be reset.
[↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-13: Select Disk to Reset

Step 3: **Reset Disk Verification**. After reading the warning, press **Y** to reset the selected disks as non-RAID, or **N** to return to the **Reset RAID Data** menu. See **Figure G-14**.

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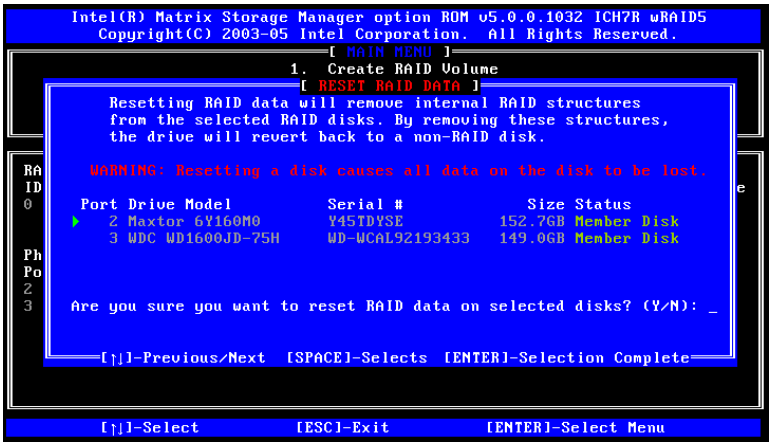
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
[RESET RAID DATA]
Resetting RAID data will remove internal RAID structures
from the selected RAID disks. By removing these structures,
the drive will revert back to a non-RAID disk.
WARNING: Resetting a disk causes all data on the disk to be lost.
Port Drive Model Serial # Size Status
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Member Disk
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk
Are you sure you want to reset RAID data on selected disks? (Y/N): _
[↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-14: Reset Disk Verification

Step 4: **Disk Drive and RAID Volume Status**. After the disk drives have been reset, the **Matrix Storage Manager Main** menu is shown indicating the status of the RAID volumes and disk drives. See **Figure G-15**.

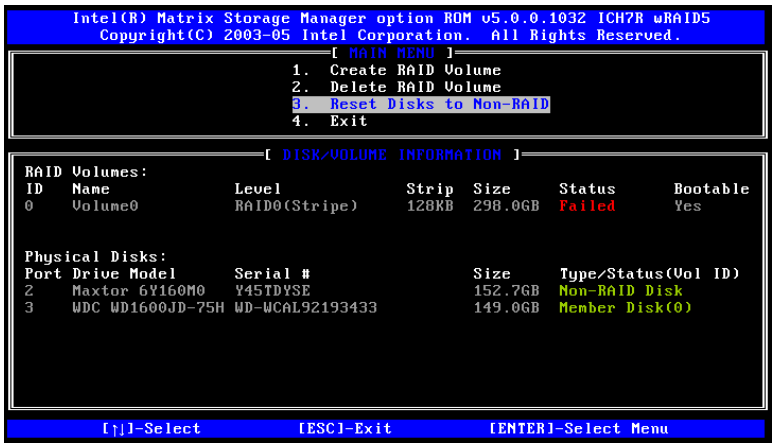
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID0(Stripe) 128KB 298.0GB Failed Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Non-RAID Disk
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk(0)
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-15: Disk Drive and RAID Volume Status

G.4.4 Exiting the Matrix Storage Manager

Step 1: **Select** "**Exit**." Use the arrow keys to highlight **Exit** and press **ENTER**. See **Figure G-16**.

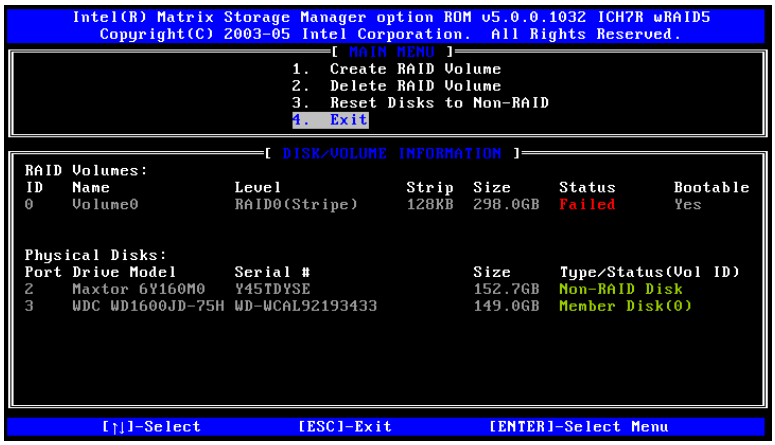
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID0(Stripe) 128KB 298.0GB Failed Yes
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Non-RAID Disk
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk(0)
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-16: Exit Menu

Step 2: **Exit Verification**. Press **Y** to exit the **Matrix Storage Manager**, or **N** to return to the **Main** menu. See **Figure G-17**.

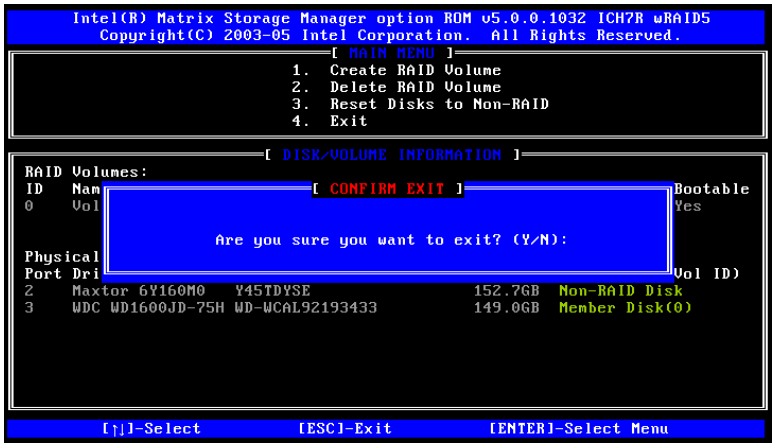
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
[CONFIRM EXIT]
Are you sure you want to exit? (Y/N):
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Non-RAID Disk
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk(0)
[↑↓]-Select [ESC]-Exit [ENTER]-Select Menu

Figure G-17: Exit Verification

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Product Service

Diagnosis and Debug

CyberResearch, Inc. maintains technical support lines staffed by experienced Applications Engineers and Technicians. There is no charge to call and we will return your call promptly if it is received while our lines are busy. Most problems encountered with data acquisition products can be solved over the phone. Signal connections and programming are the two most common sources of difficulty. CyberResearch support personnel can help you solve these problems, especially if you are prepared for the call.

To ensure your call's overall success and expediency:

1) Have the phone close to the PC so you can conveniently and quickly take action that the Applications Engineer might suggest.
2) Be prepared to open your PC, remove boards, report back-switch or jumper settings, and possibly change settings before reinstalling the modules.
3) Have a volt meter handy to take measurements of the signals you are trying to measure as well as the signals on the board, module, or power supply.
4) Isolate problem areas that are not working as you expected.
5) Have the source code to the program you are having trouble with available so that preceding and prerequisite modes can be referenced and discussed.
6) Have the manual at hand. Also have the product's utility disks and any other relevant disks nearby so programs and version numbers can be checked.

Preparation will facilitate the diagnosis procedure, save you time, and avoid repeated calls. Here are a few preliminary actions you can take before you call which may solve some of the more common problems:

1) Check the PC-bus power and any power supply signals.
2) Check the voltage level of the signal between SIGNAL HIGH and SIGNAL LOW, or SIGNAL+ and SIGNAL– . It CANNOT exceed the full scale range of the board.
3) Check the other boards in your PC or modules on the network for address and interrupt conflicts.
4) Refer to the example programs as a baseline for comparing code.

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Warranty Notice

CyberResearch, Inc. warrants that this equipment as furnished will be free from defects in material and workmanship for a period of one year from the confirmed date of purchase by the original buyer and that upon written notice of any such defect, CyberResearch, Inc. will, at its option, repair or replace the defective item under the terms of this warranty, subject to the provisions and specific exclusions listed herein.

This warranty shall not apply to equipment that has been previously repaired or altered outside our plant in any way which may, in the judgment of the manufacturer, affect its reliability. Nor will it apply if the equipment has been used in a manner exceeding or inconsistent with its specifications or if the serial number has been removed.

CyberResearch, Inc. does not assume any liability for consequential damages as a result from our products uses, and in any event our liability shall not exceed the original selling price of the equipment.

The equipment warranty shall constitute the sole and exclusive remedy of any Buyer of Seller equipment and the sole and exclusive liability of the Seller, its successors or assigns, in connection with equipment purchased and in lieu of all other warranties expressed implied or statutory, including, but not limited to, any implied warranty of merchant ability or fitness and all other obligations or liabilities of seller, its successors or assigns.

The equipment must be returned postage prepaid. Package it securely and insure it. You will be charged for parts and labor if the warranty period has expired.

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If a CyberResearch product has been diagnosed as being non-functional, is visibly damaged, or must be returned for any other reason, please call for an assigned RMA number. The RMA number is a key piece of information that lets us track and process returned merchandise with the fastest possible turnaround time.

PLEASE CALL FOR AN RMA NUMBER!

Packages returned without an RMA number will be refused!

In most cases, a returned package will be refused at the receiving dock if its contents are not known. The RMA number allows us to reference the history of returned products and determine if they are meeting your application's requirements. When you call customer service for your RMA number, you will be asked to provide information about the product you are returning, your address, and a contact person at your organization.

Please make sure that the RMA number is prominently displayed on the outside of the box.

• Thank You •

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